The Scientific Method and The Climate

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Richard Feynman on Science

- We can’t prove anything.
- We can only disprove something.

- Science is the belief in the ignorance of experts. (What they don’t know- yet)

Examples of the Scientific Method

- Einstein's Theory of Relativity
  - Gravity distorts space-time demonstrated by observation of Mercury
- Neils Bohr theory of quantum physics
  - Answered observations of particle physics
  - Bohr tried to disprove his theory for the rest of his life
- Entangled particles theory (superposition)
  - Einstein supported idea of "pair of gloves" analogy
  - Irish physicist Bell's experiment proved Einstein wrong
- Wegener's theory of continental drift (plate tectonics) in 1912
  - Rejected by mainstream geologists until 1950

Terms

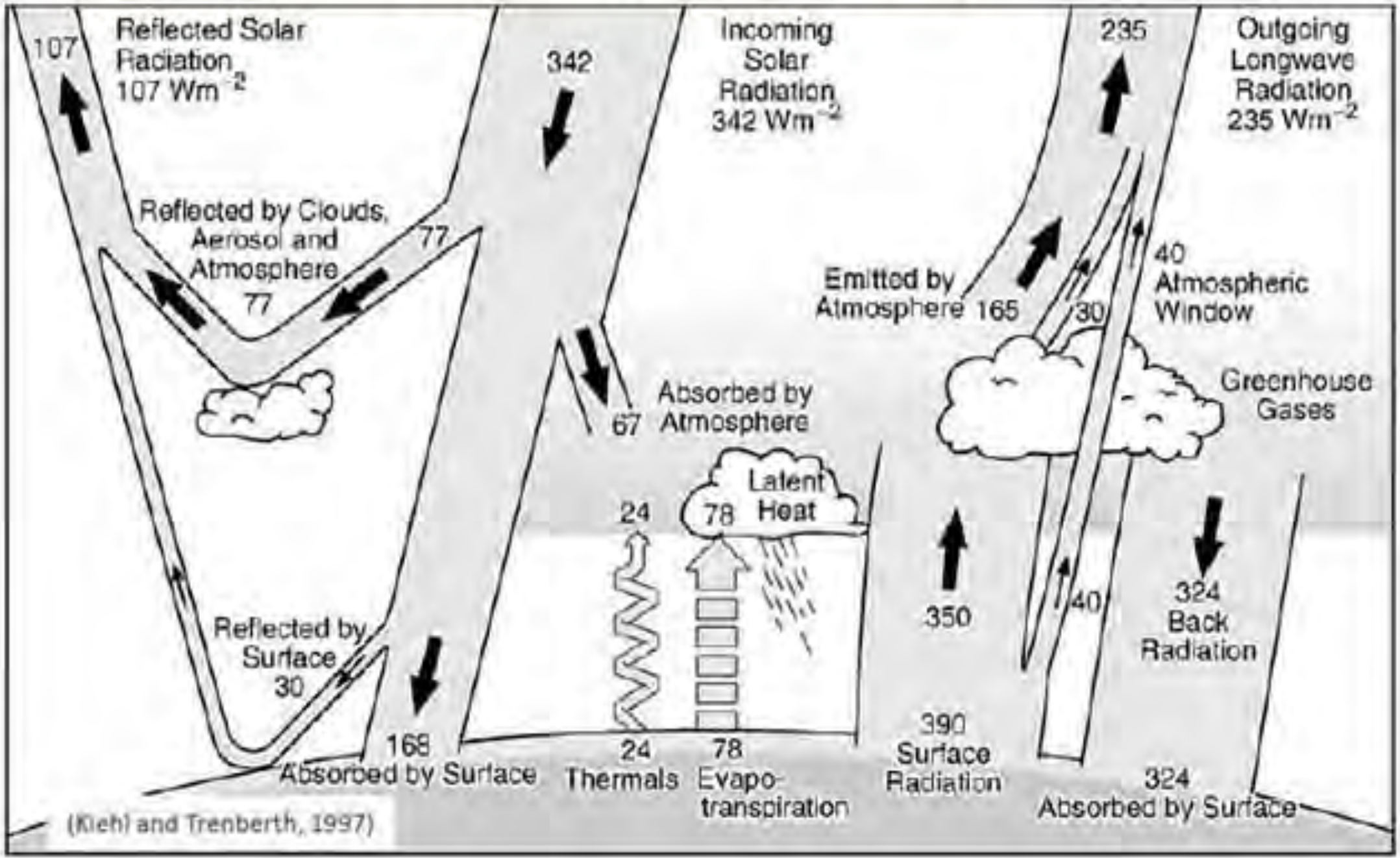
- Old School:
  - Hypothesis-> Theory -> Law
- Current Usage:
  - Hypothesis -> Model -> Theory

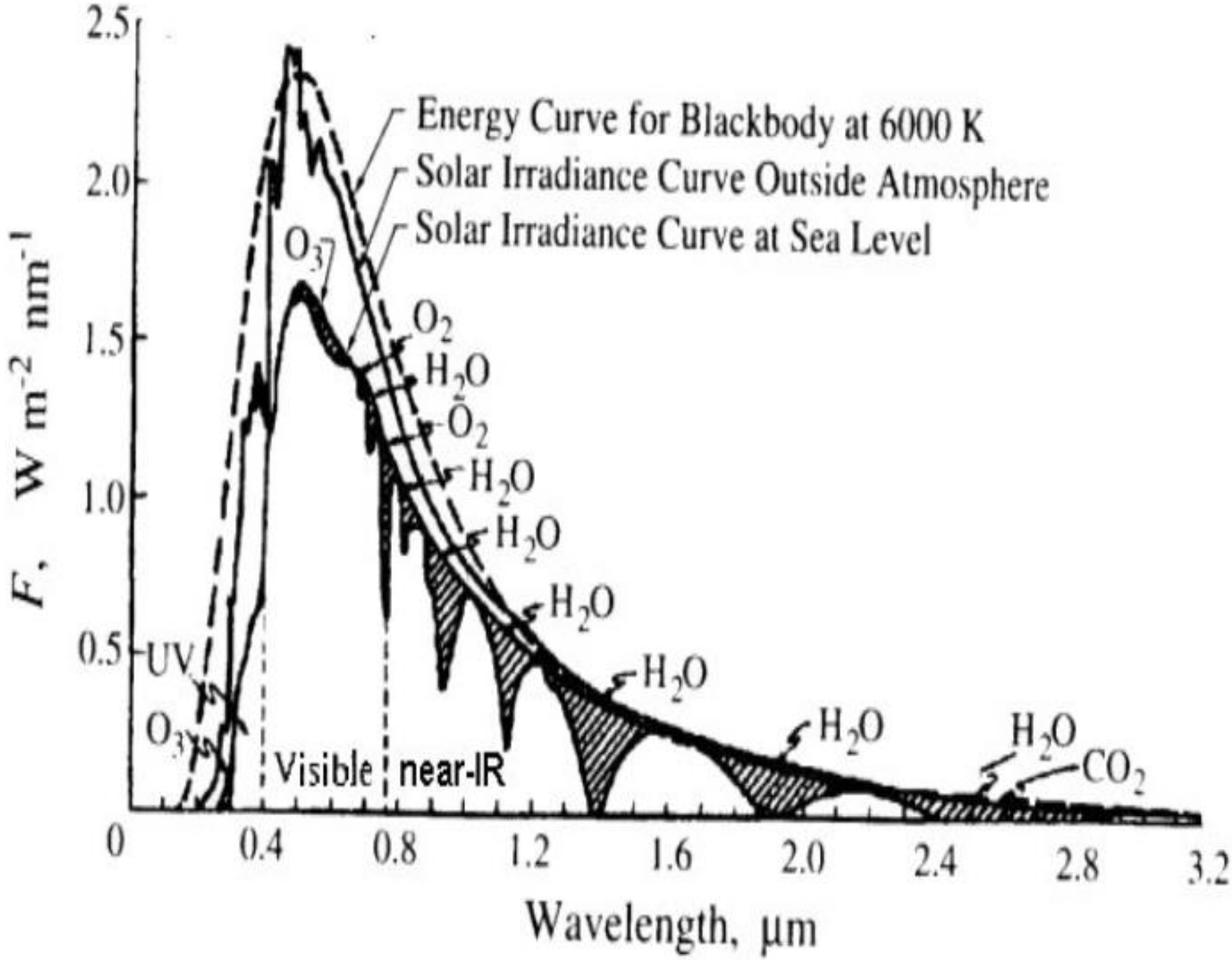
- Hypothesis must
  - explain observed data
  - be falsifiable
  - be specific; quantified
  - must predict experimental outcomes (or future observables)

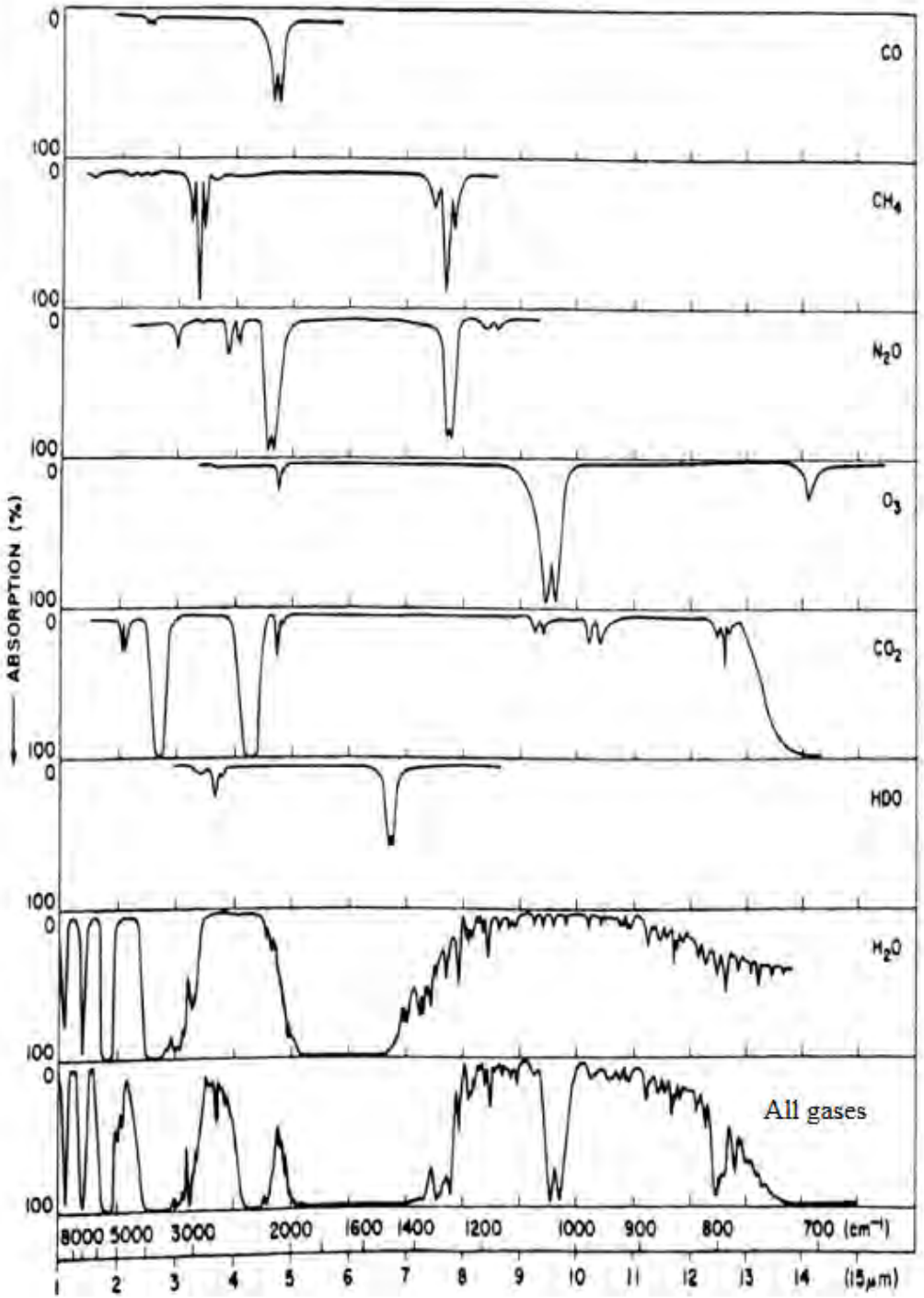
What is the Climate Issue?

- What are the physics of the atmosphere?
- What are the hypotheses & theories?
- What are the data sources?
- What predictions do the models make?
- What hypotheses do the data support or disprove?

Global and Annual Average Energy Budget – units W/m^2




Energy Curve for Blackbody at 6000 K
Solar Irradiance Curve Outside Atmosphere
Solar Irradiance Curve at Sea Level
F, W m-2 nm-1
2.5
2.0
1.5
1.0
0.5
0
O3
O2
H2O
O2
H2O
H2O
H2O
H2O
H2O
H2O
CO2
UV
O3
Visible
near-IR
0.4
0.8
1.2
1.6
2.0
2.4
2.8
3.2
Wavelength, μm

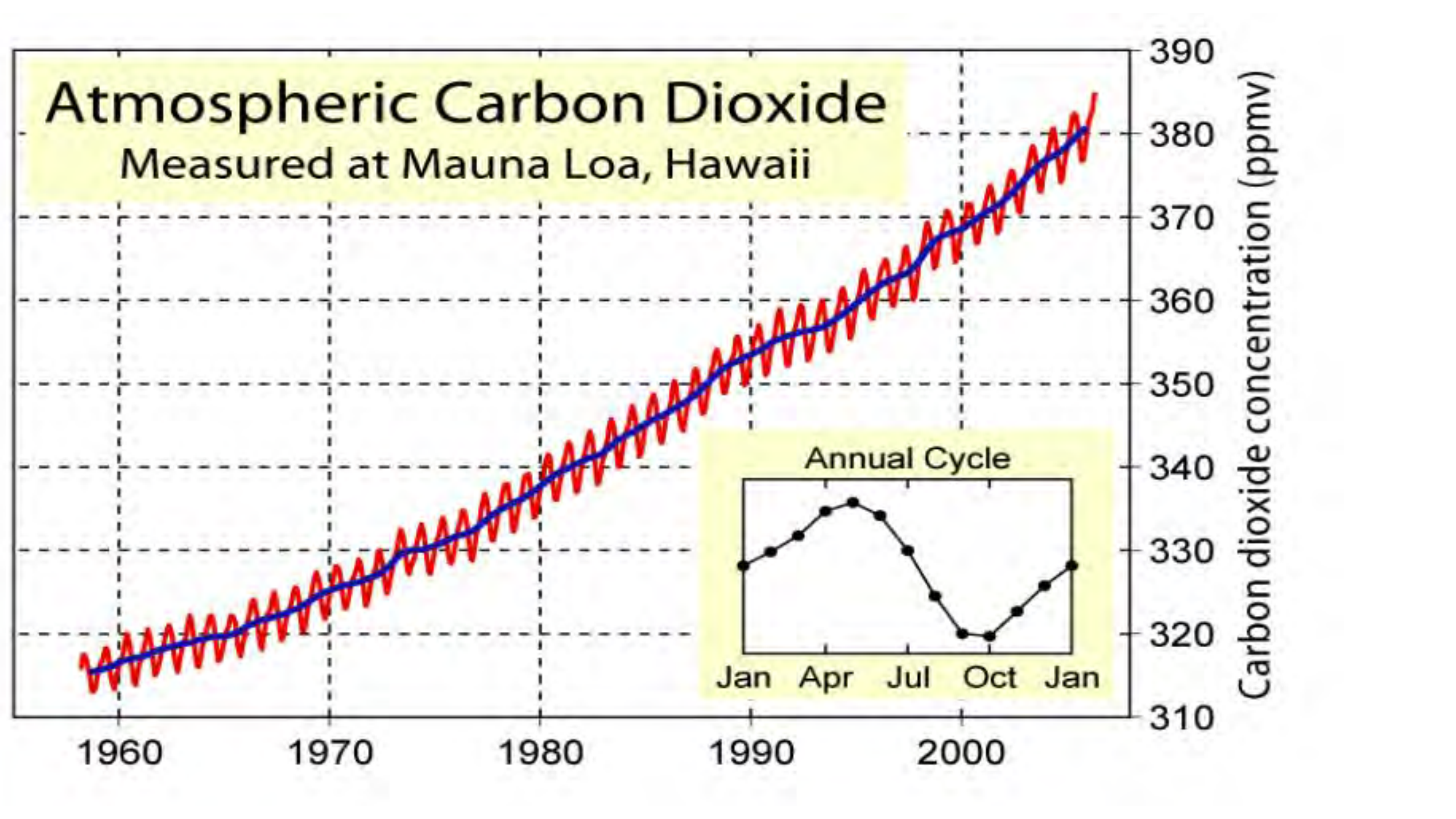


Transmission specra of various atmospheric gases in the infrared

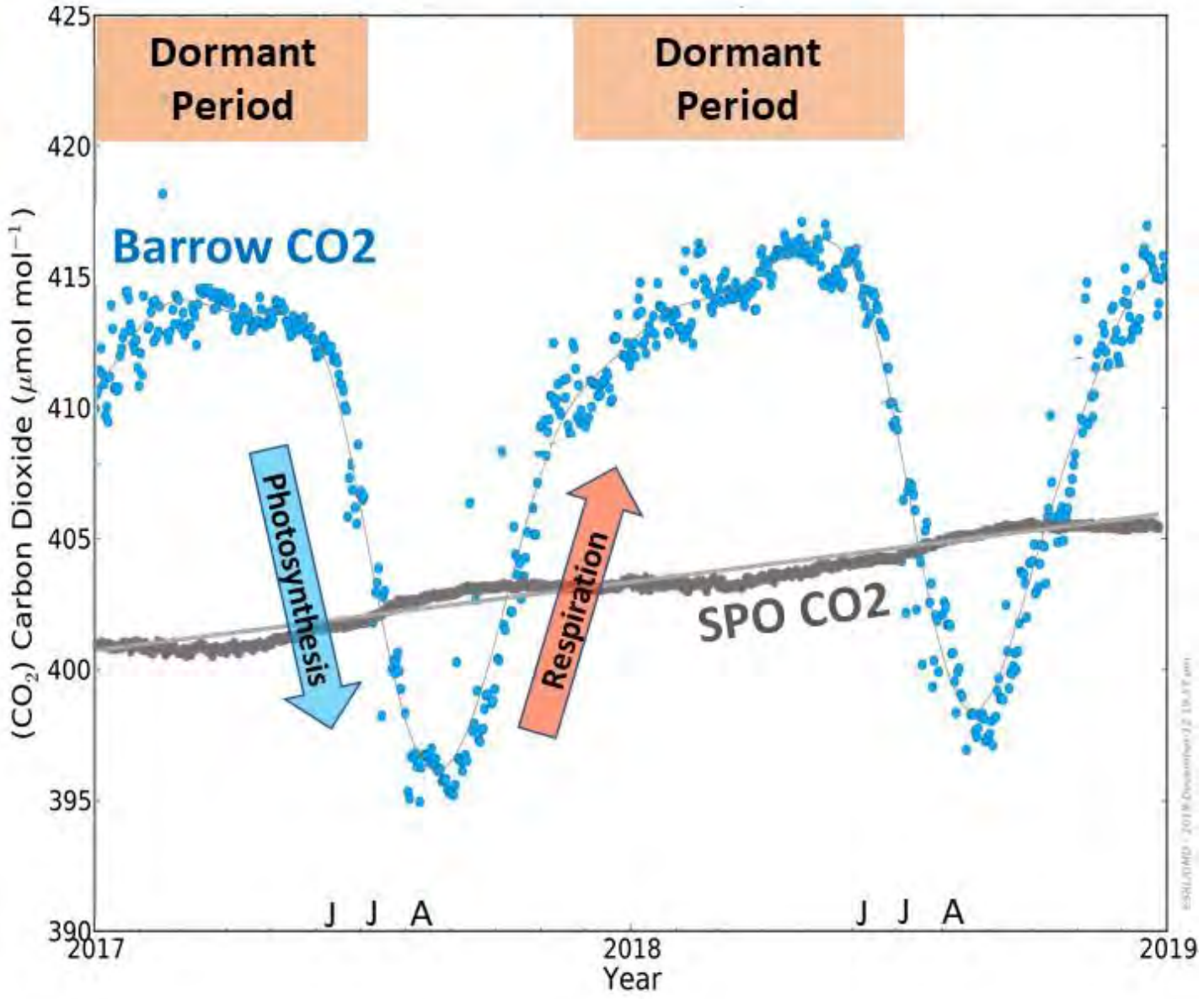
CO_2

H_2O

All gases


Atmospheric Carbon Dioxide
Measured at Mauna Loa, Hawaii
Annual Cycle
Jan
Apr
Jul
Oct
Jan
1960
1970
1980
1990
2000
310
320
330
340
350
360
370
380
390
Carbon dioxide concentration (ppmv)

Arctic CO_2 Cycles Compared to Antarctic



Greenland Ice Core CO2 Concentrations Deserve Reconsideration

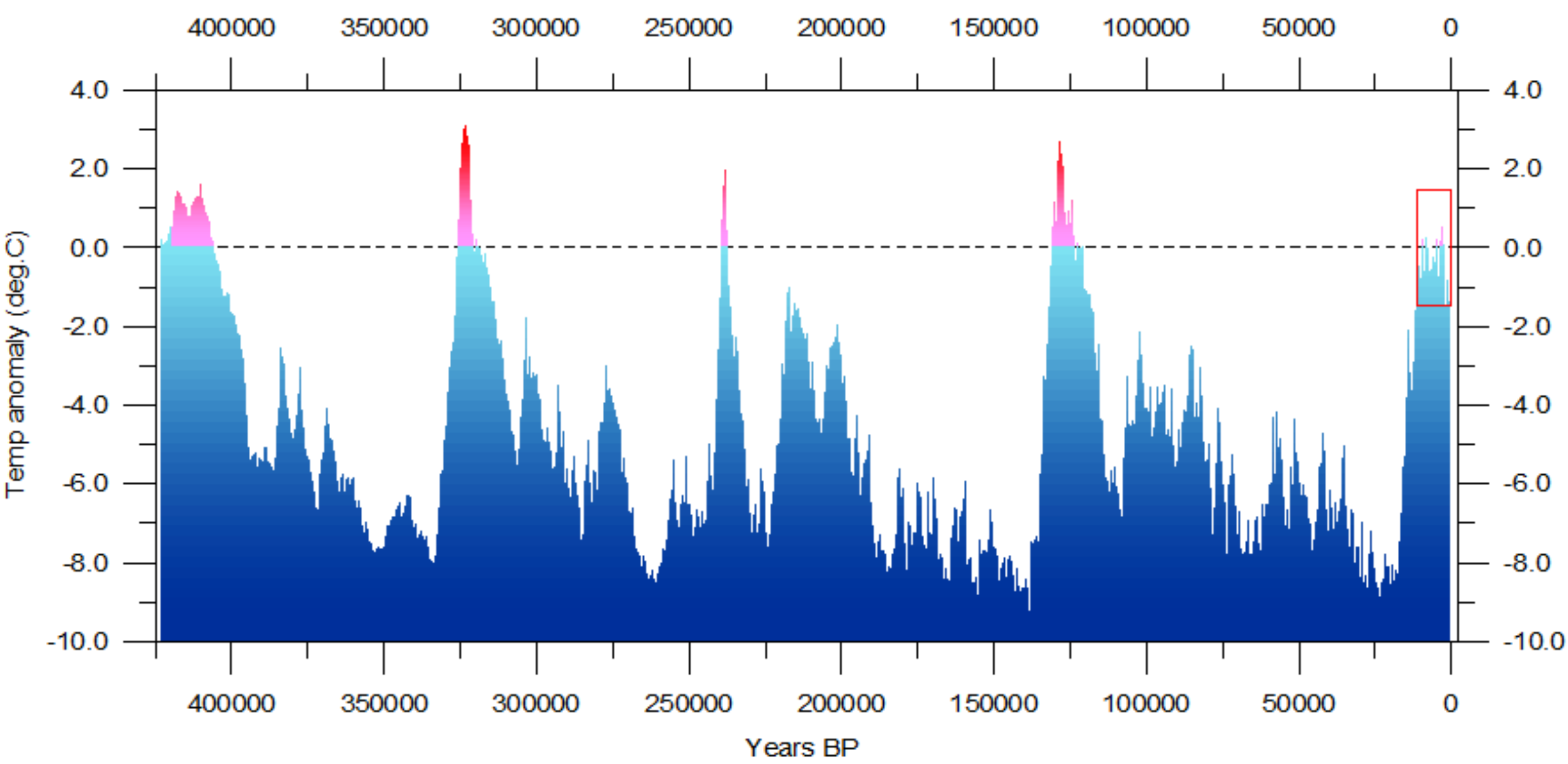
Andy May / January 7, 2020

https://wattsupwiththat.com/2020/01/07/greenland-ice-core-co2-concentrations-deserve-reconsideration/

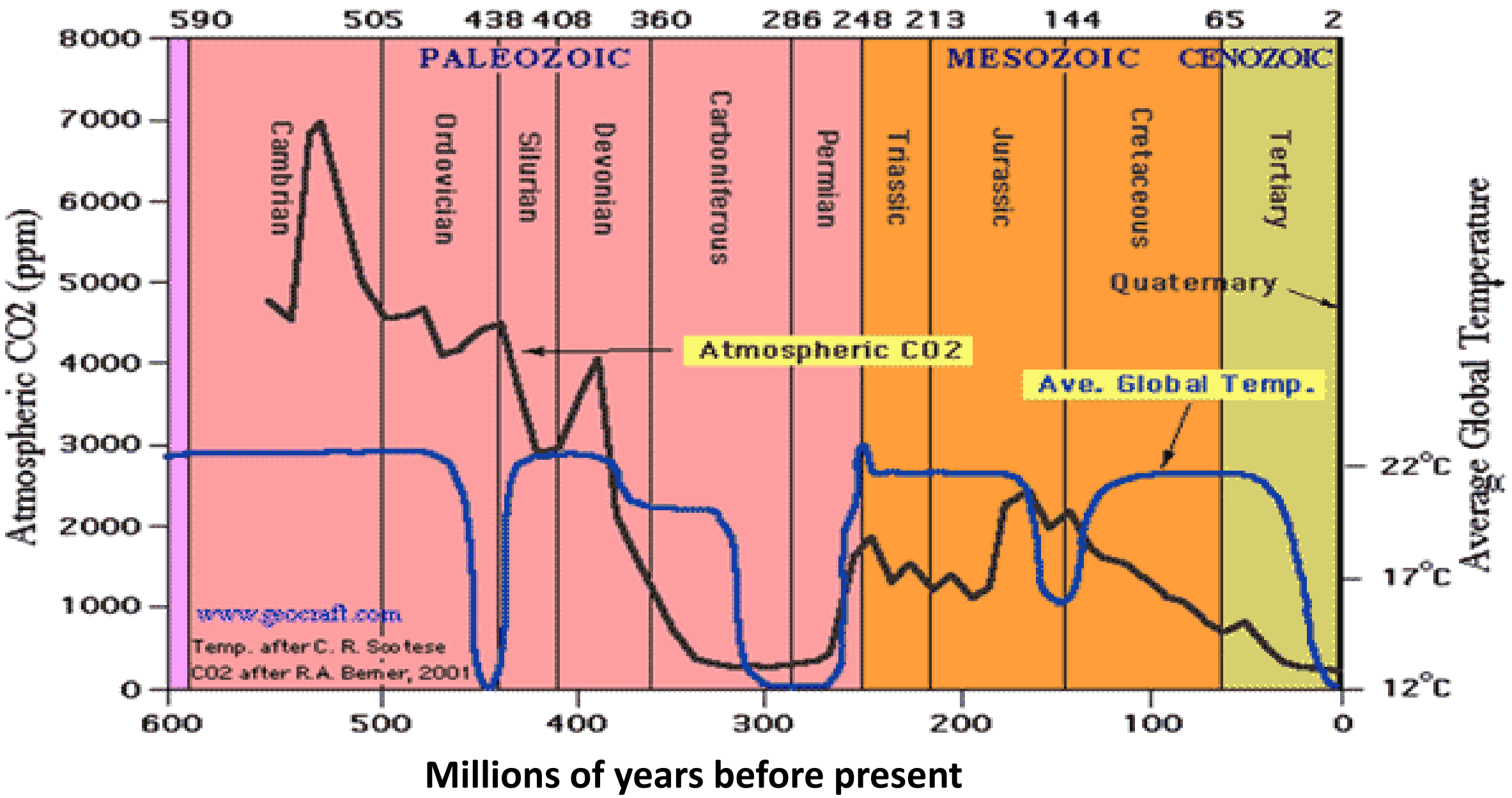
Hypotheses

- Warmists: man-made CO2 is driving the thermal balance
- Skeptics: natural processes govern the thermal balance. Recent weather is not unusual

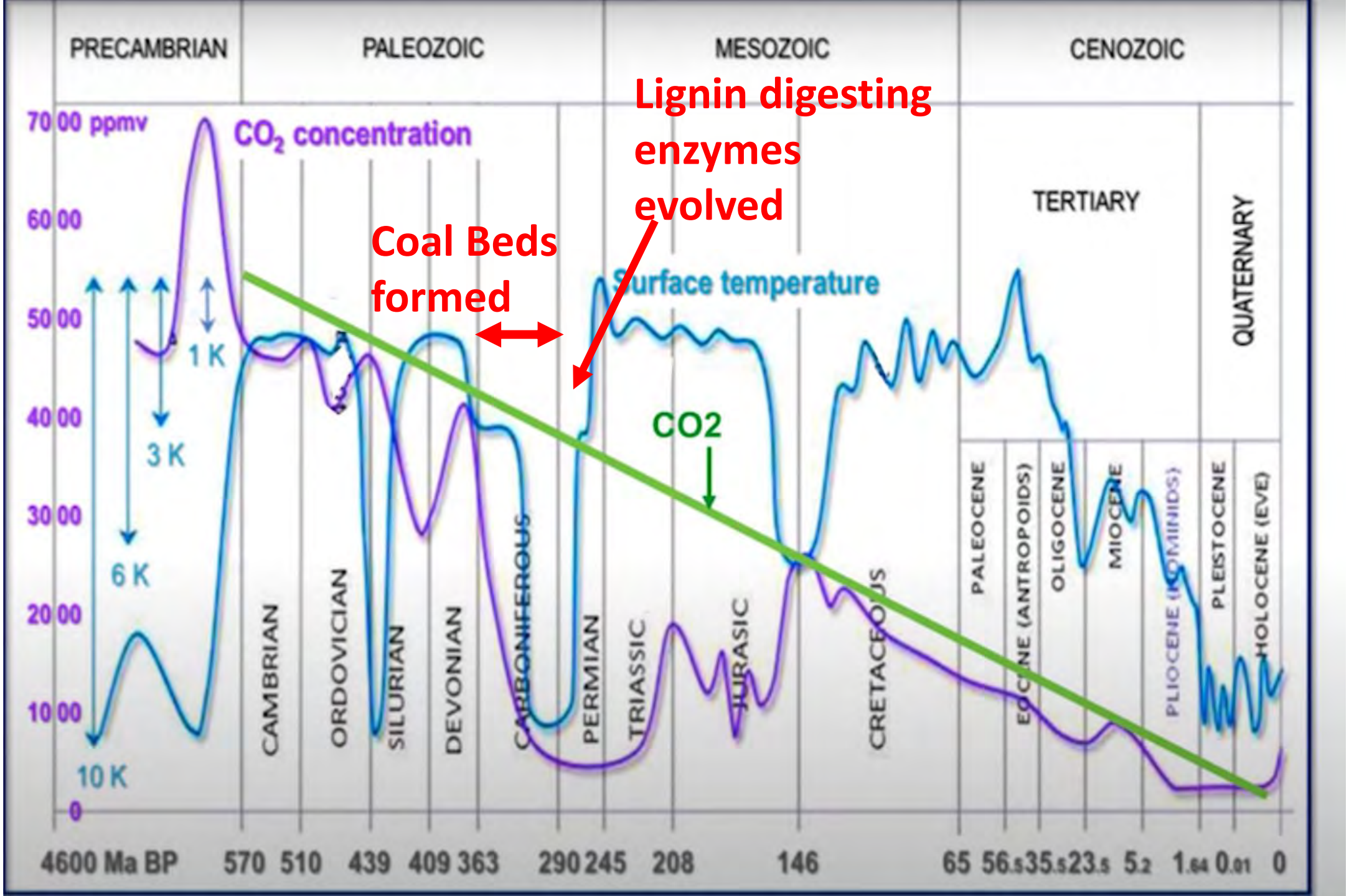
- Nature exhibits cyclic processes not well understood
  - El Nino Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO), Atlantic Decadal Oscillation (ADO), Eddy Cycle, De Vries/Suess solar cycle, etc.
  - Except Milankovitch cycles are understood, but are very long term

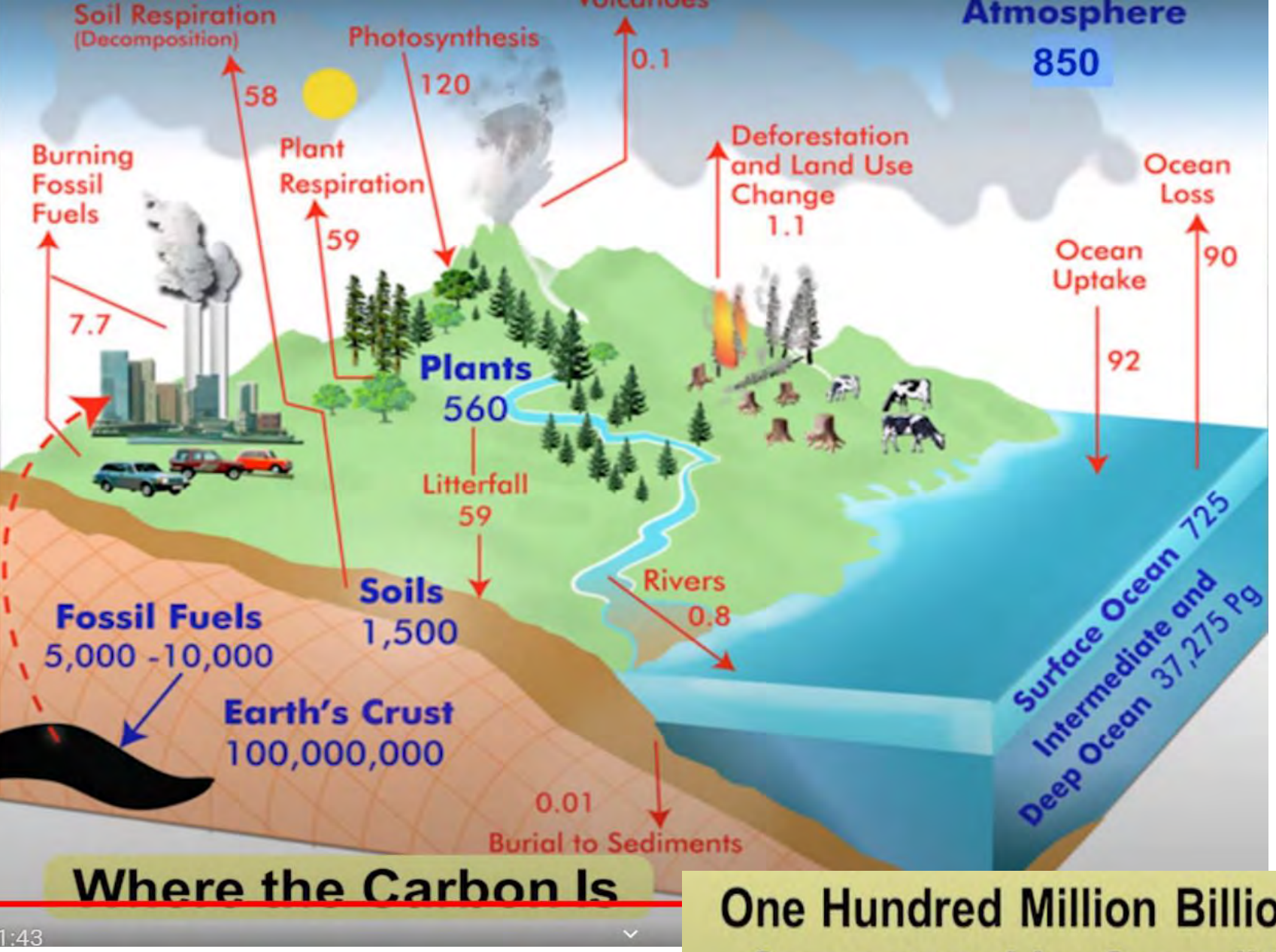


Ice Ages Resulting from Milankovitch Cycles



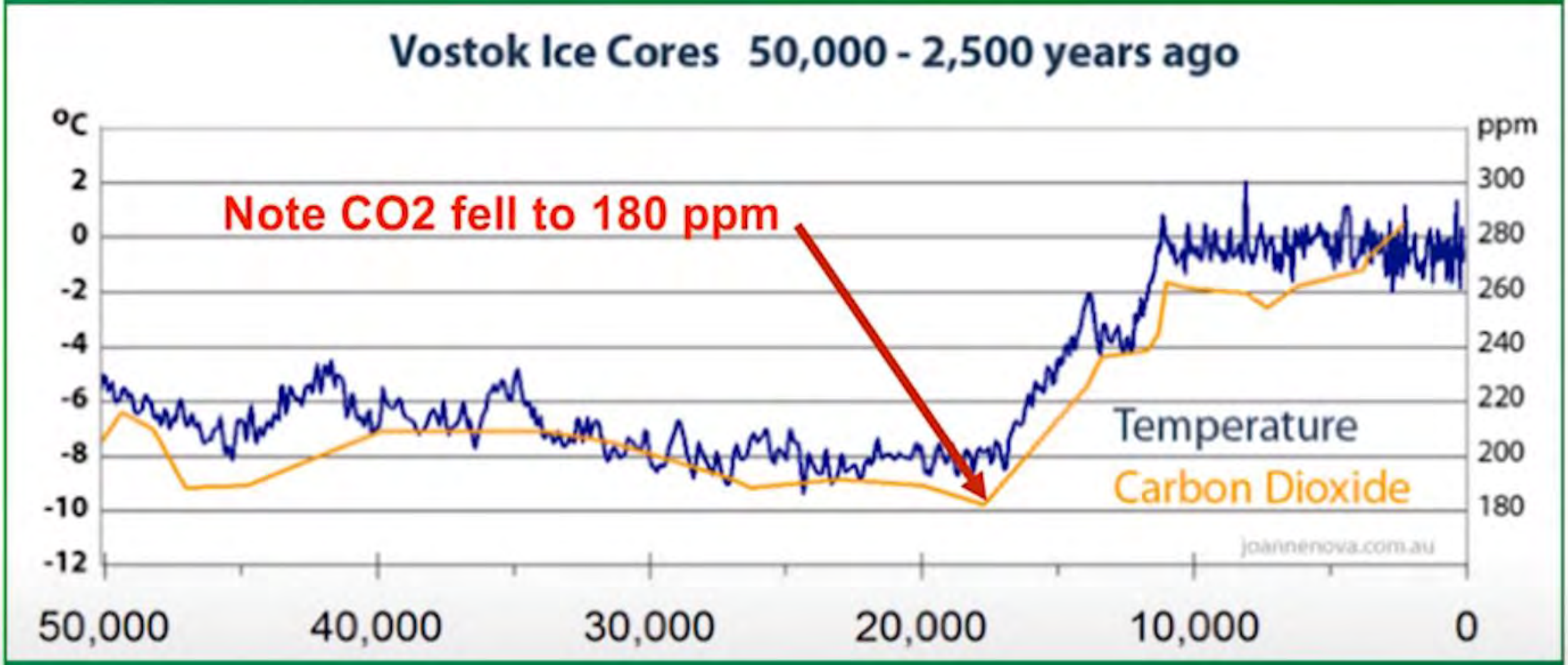
The Truth About Climate Change - Dr. Patrick Moore - Greenpeace Co-Founder
https://www.youtube.com/watch?v=v3A4wrPU2jY Also following 4 charts


PRECAMBRIAN
PALEOZOIC
MESOZOIC
CENOZOIC
Lignin digesting enzymes evolved
Coal Beds formed
Surface temperature
CO2
CO_2 concentration
70 00 ppmv
60 00
50 00
40 00
30 00
20 00
10 00
0
1 K
3 K
6 K
10 K
TERTIARY
QUATERNARY
CAMBRIAN
ORDOVICIAN
SILURIAN
DEVONIAN
CARBONIFEROUS
PERMIAN
TRIASSIC
JURASIC
CRETACEOUS
PALEOCENE
EOCENE (ANTROPOIDS)
OLIGOCENE
MIOCENE
PLIOCENE (HOMINIDS)
PLEISTOCENE
HOLOCENE (EVE)
4600 Ma BP
570
510
439
409
363
290
245
208
146
65
56.5
35.5
23.5
5.2
1.64
0.01
0

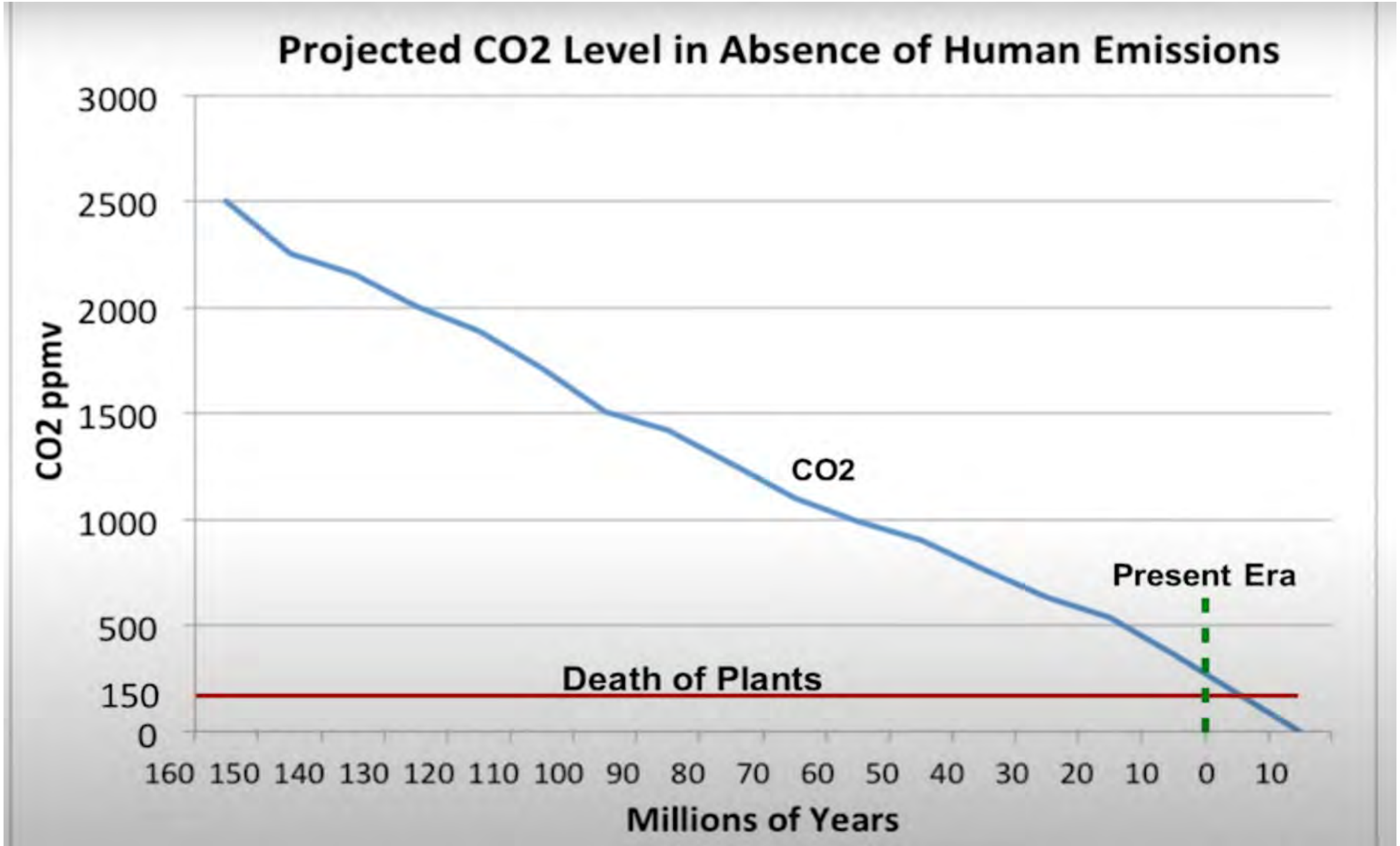


99% of all CO2 ever in the atmosphere is now in chalk, limestone and marble.
Units of billions of tons

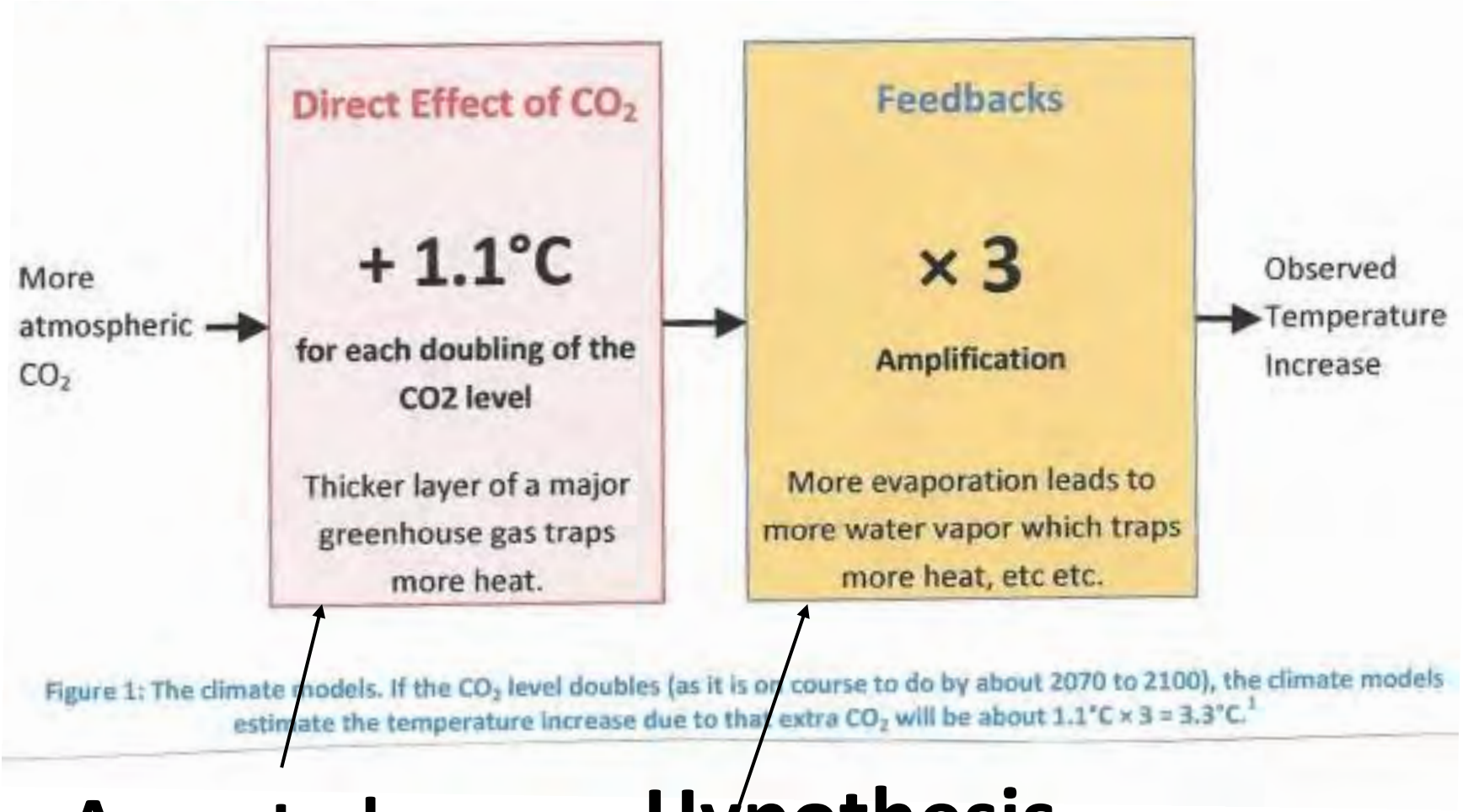
One Hundred Million Billion Tons of Carbon have been Sequestered by Coccolithophores (Phytoplankton), Shellfish, Corals and Foraminifera (Zooplankton)



CO2 fell to 180 ppm 18,000 years ago, almost certainly the lowest in the Earth's history


Projected CO2 Level in Absence of Human Emissions
3000
2500
2000
1500
1000
500
150
0
CO2 ppmv
CO2
Present Era
Death of Plants
160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10
Millions of Years

Warmists' Hypothesis



Accepted Science

Hypothesis

Skeptics' Hypothesis

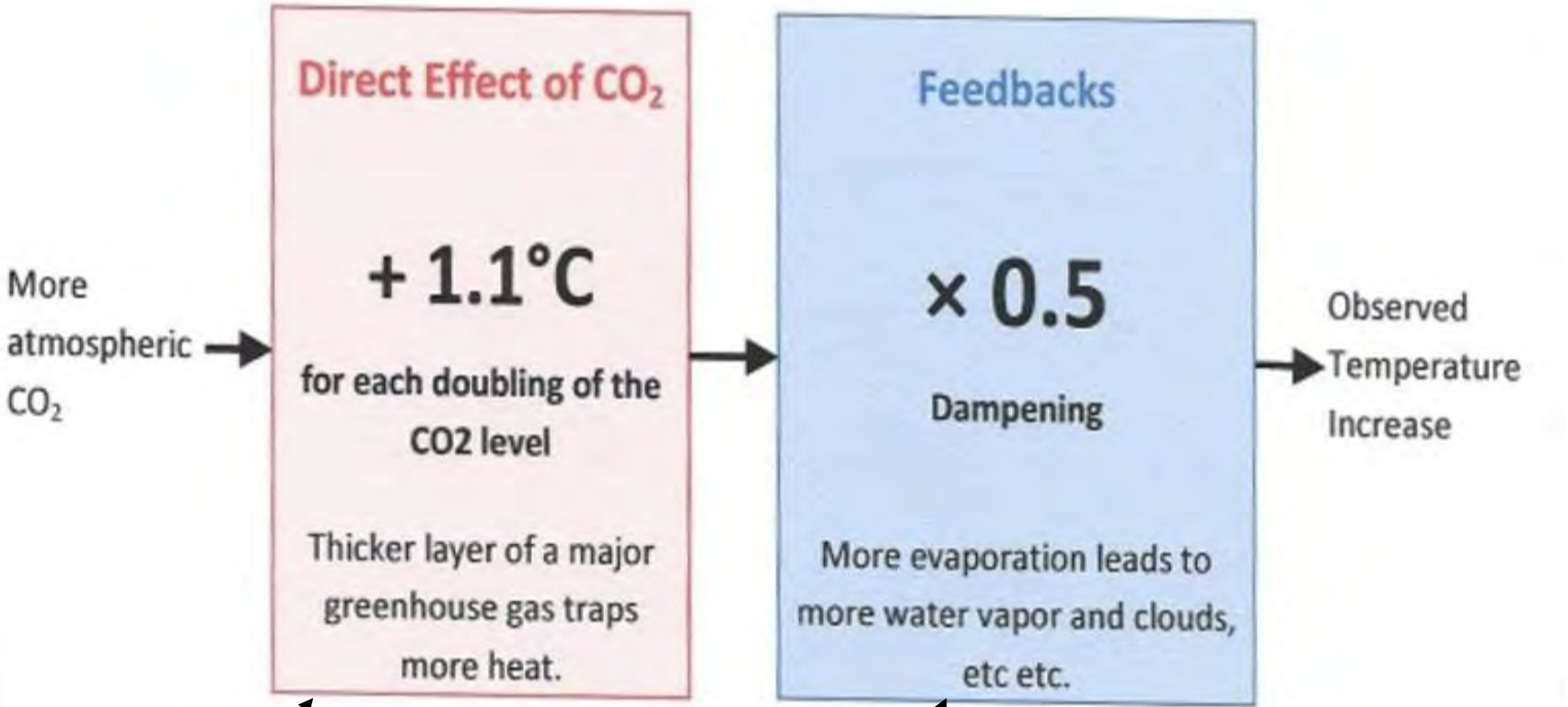
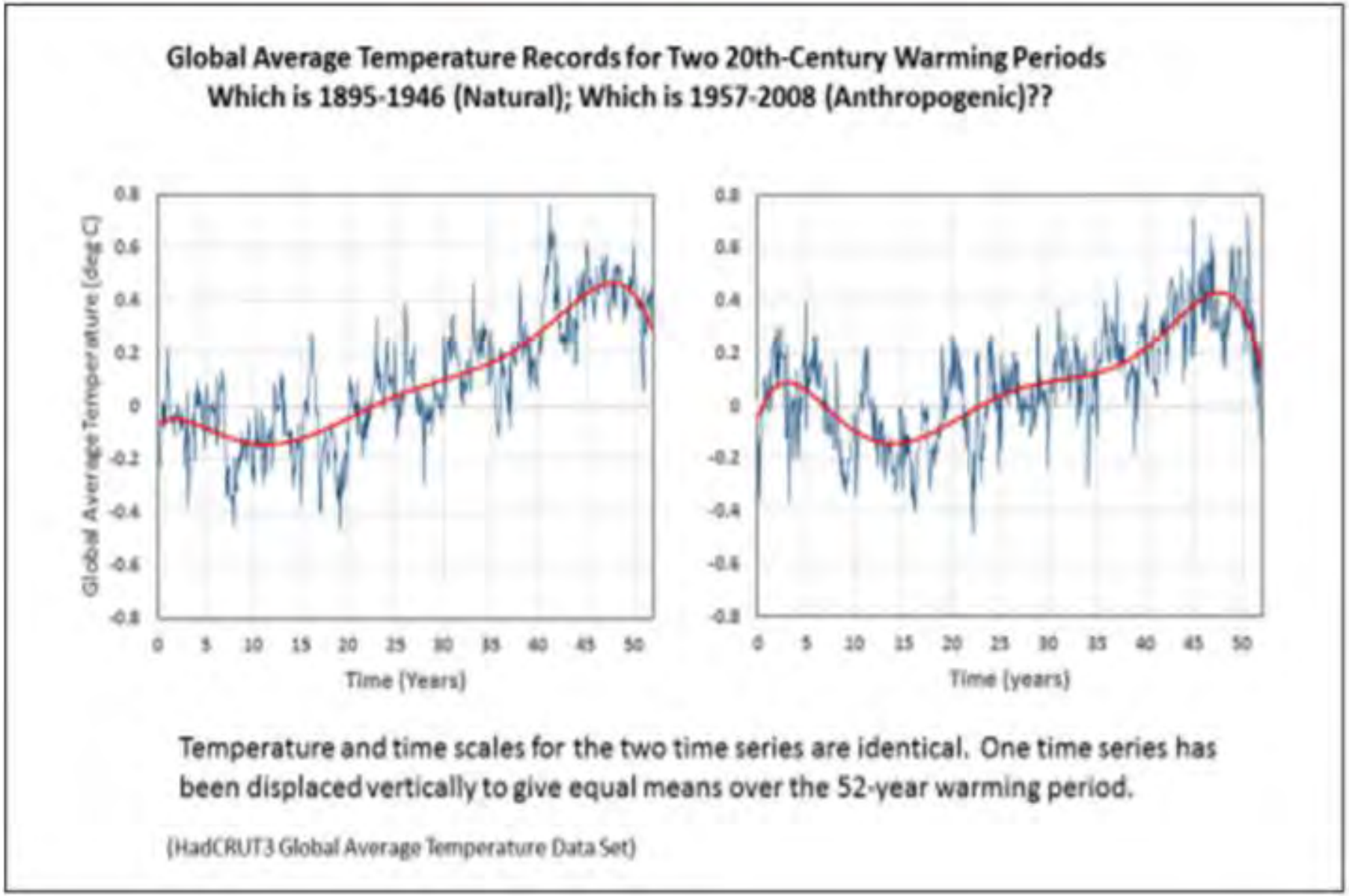


Figure 2: The skeptic's view. If the CO_2 level doubles, skeptics estimates that the temperature increase due to that extra CO_2 will be about 1.1°C × 0.5 = 0.6°C.[4]

Accepted Science

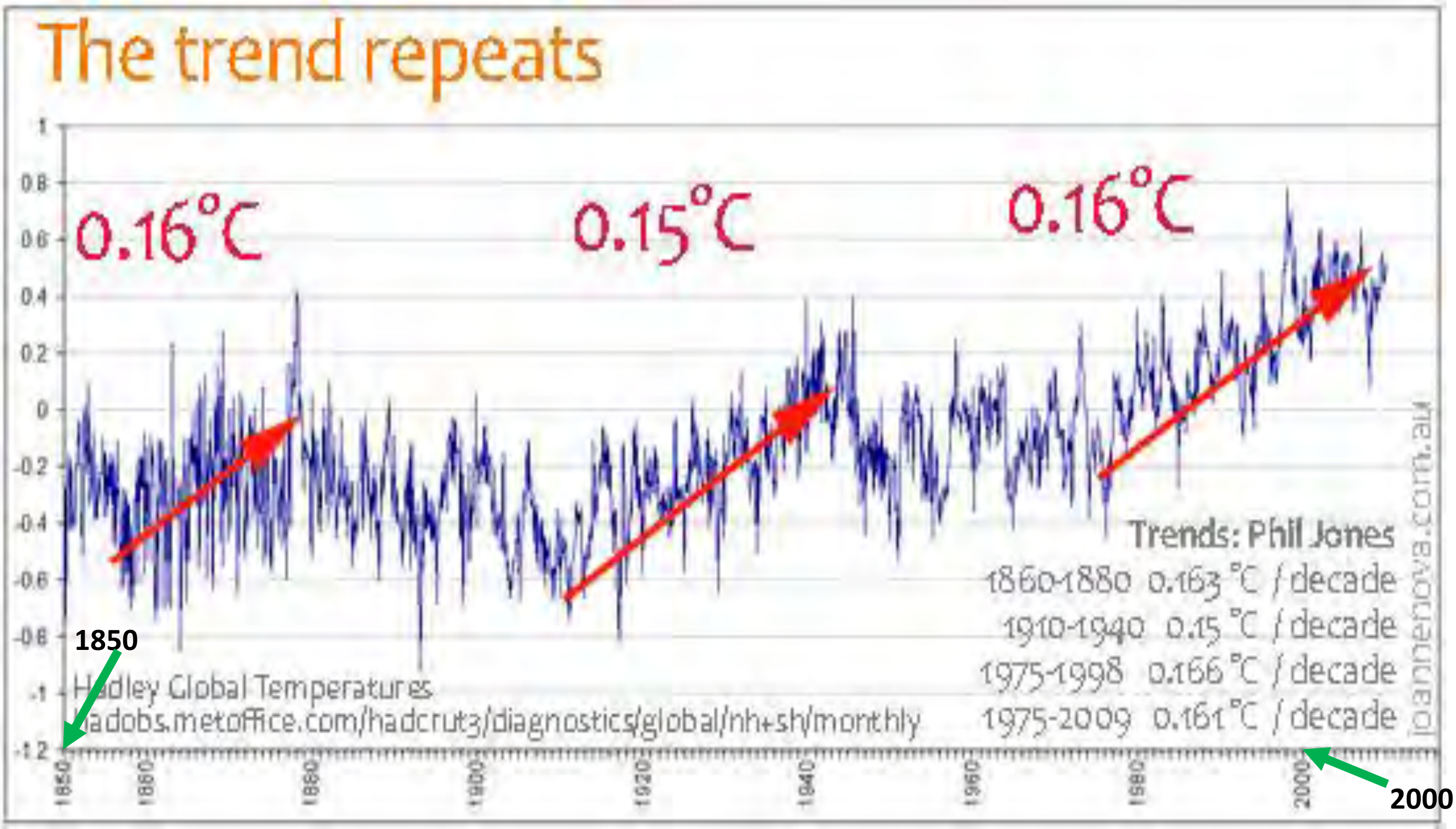
Hypothesis

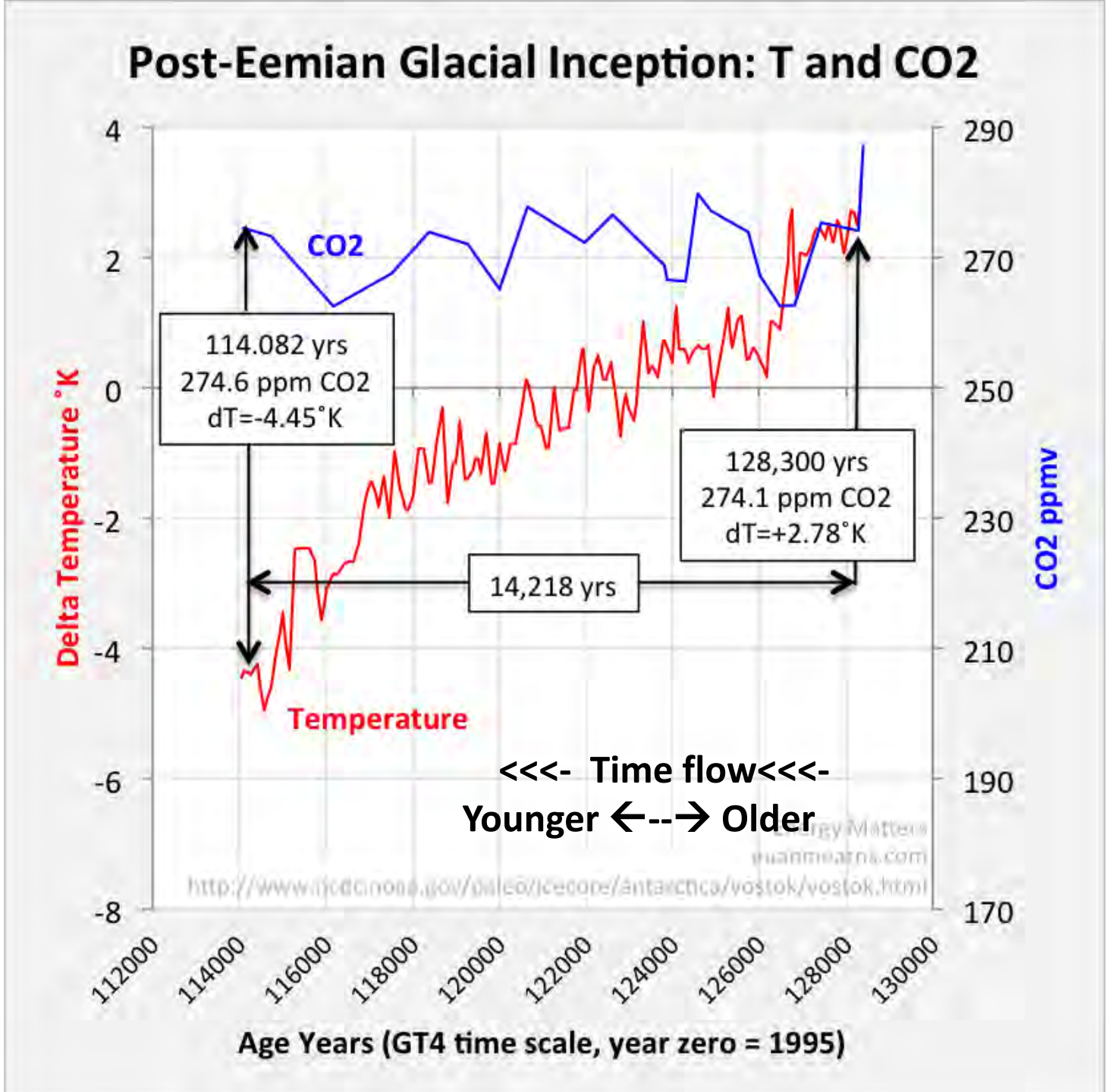
Figure 2. Average Global Temperature During the 20th Century's Two Warming Periods*



- The warming from 1957–2008 is on the left. The irregular blue lines are monthly data. The smooth red lines are polynomial fits to the monthly data. The earlier warming, from 1895 to 1946, occurred before significant CO2 increases and must come from other, natural influences. Source: HadCRUT3 data set, Climatic Research Unit of the University of East Anglia

The trend repeats





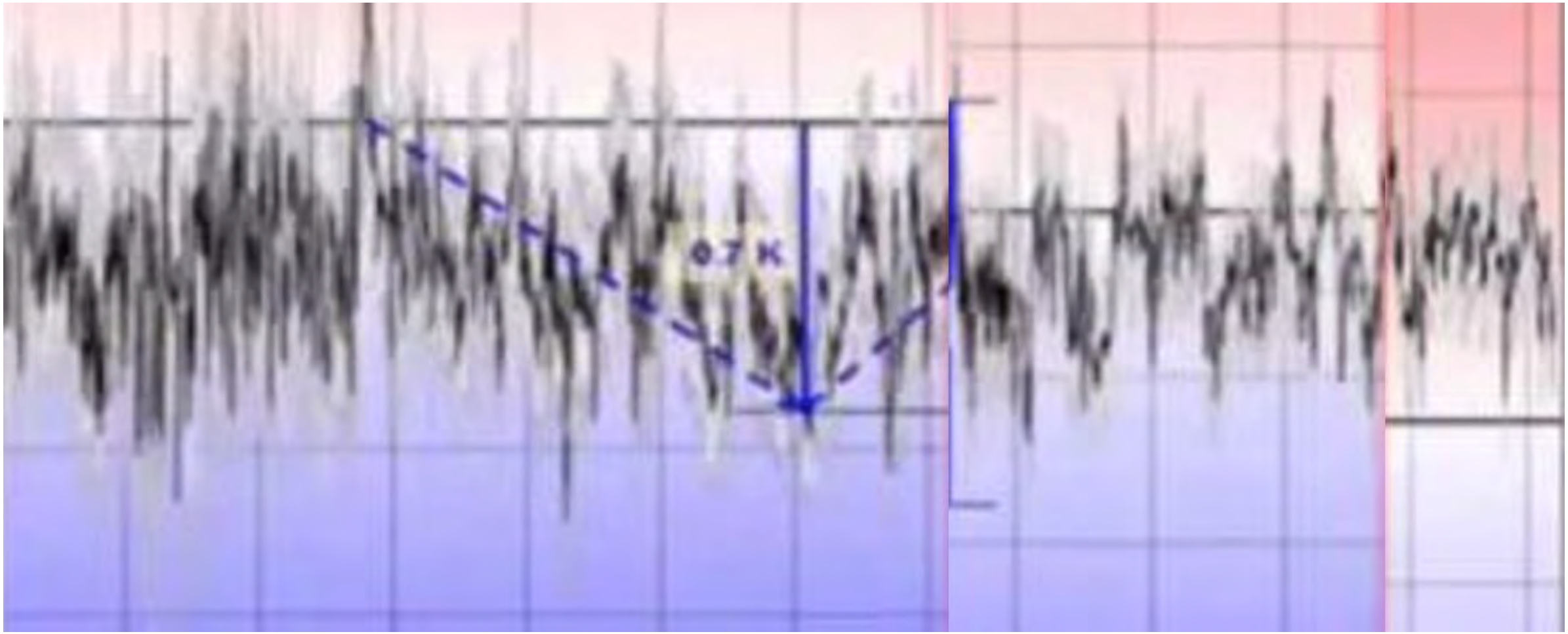
https://euanmearns.com/the-vostok-ice-core-and-the-14000-year-co2-time-lag/

- **The following chart shows the historical global mean temperature record from 1850 to 2013 with two 20 years segments removed and the three remaining pieces shifted to make their means approximately equal. The vertical temperature scales are the same.**

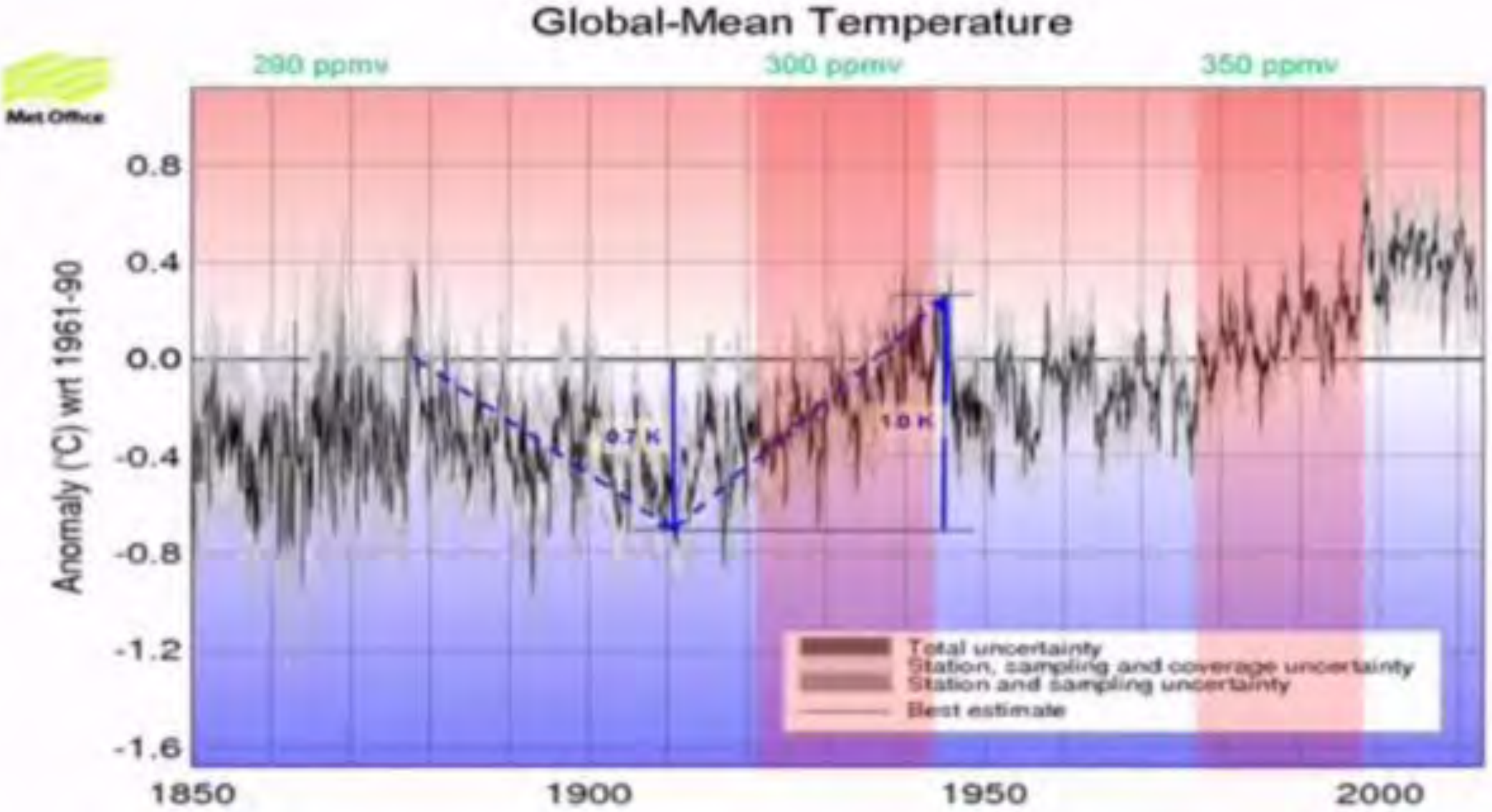
- **What global warming does this data show?**

- **NONE.**
- **Not in 50 of the last 70 years, or in 123 of the last 163 years**

Historical global mean temperature record 1850-2013 (163 yrs) with two 20-year periods missing



- The following chart is the unaltered global mean temperature chart with the two warming sections highlighted.


Global-Mean Temperature
280 ppmv
300 ppmv
350 ppmv
Met Office
0.8
0.4
0.0
-0.4
-0.8
-1.2
-1.6
Anomaly (°C) wrt 1961-90
0.7 K
1.0 K
Total uncertainty
Station, sampling and coverage uncertainty
Station and sampling uncertainty
Best estimate
1850
1900
1950
2000

Data Sources

- **HadCRUT** is the dataset of monthly instrumental temperature records formed by combining the sea surface temperature records compiled by the **Hadley Centre of the UK Met Office** and the land surface air temperature records compiled by the **Climatic Research Unit** (CRU) of the University of East Anglia.
- **HadCRUT4** was introduced in March 2012. It "includes the addition of newly digitized measurement data, both over land and sea, new sea-surface temperature bias adjustments and a more comprehensive error model for describing uncertainties in sea-surface temperature measurements". Overall, the net effect of HadCRUT4 versus HadCRUT3 is an increase in the average temperature anomaly, especially around 1950 and 1855, and less significantly around 1925 and 2005.

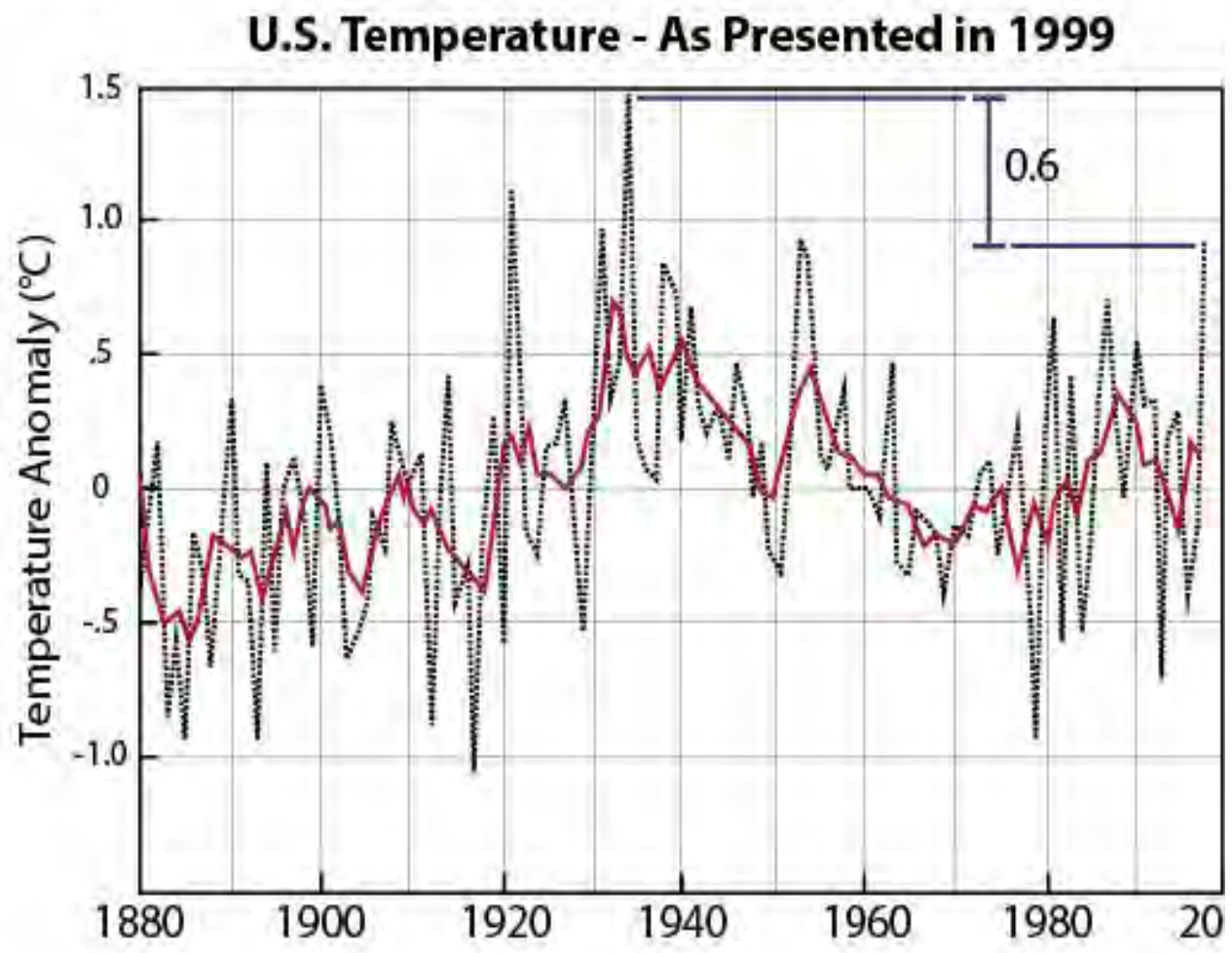
U.S. Historical Climatology Network (USHCN)

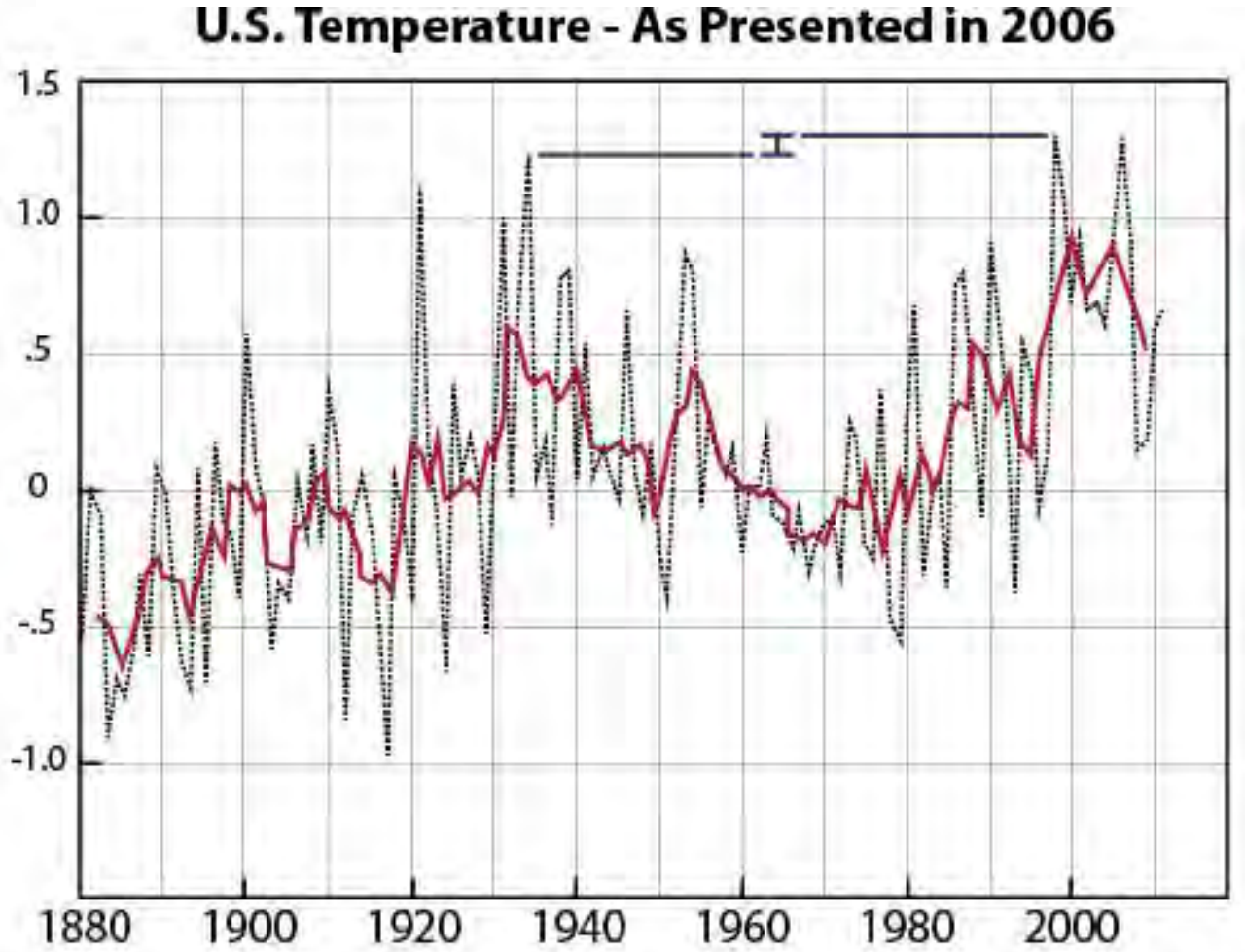
- The U.S. Historical Climatology Network (USHCN) data are used to quantify national- and regional-scale temperature changes in the contiguous United States (CONUS). The USHCN is a designated subset of the NOAA Cooperative Observer Program (COOP) Network with sites selected according to their spatial coverage, record length, data completeness, and historical stability.

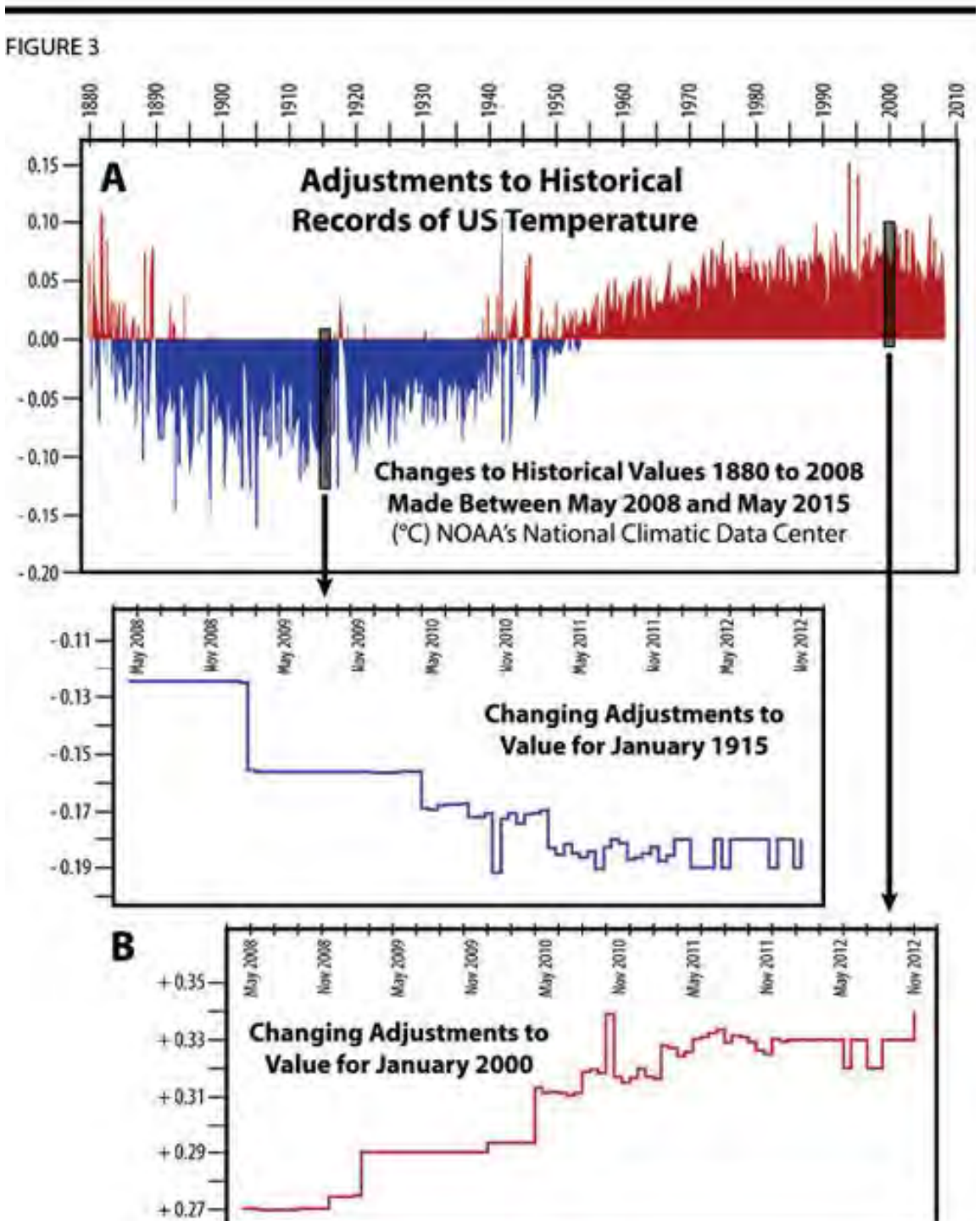
Flawed USHCN Replaced by USCRN in 2005

- Stations in the USHCN are no longer reliable or accurate due to the incursion of urban and commercial growth
- USHCN data (and other) have been severely “adjusted”, interpolated, and estimated
- US Climate Reference Network was started in 2005 to replace the USHCN with well-sited, calibrated, reliable recording stations.
- Data from the USCRN is not altered as data from the USHCN has been
- USCRN is only US data and now contains 15 years of data
  - ~20-30 years is expected to make statements about climate (vs weather)

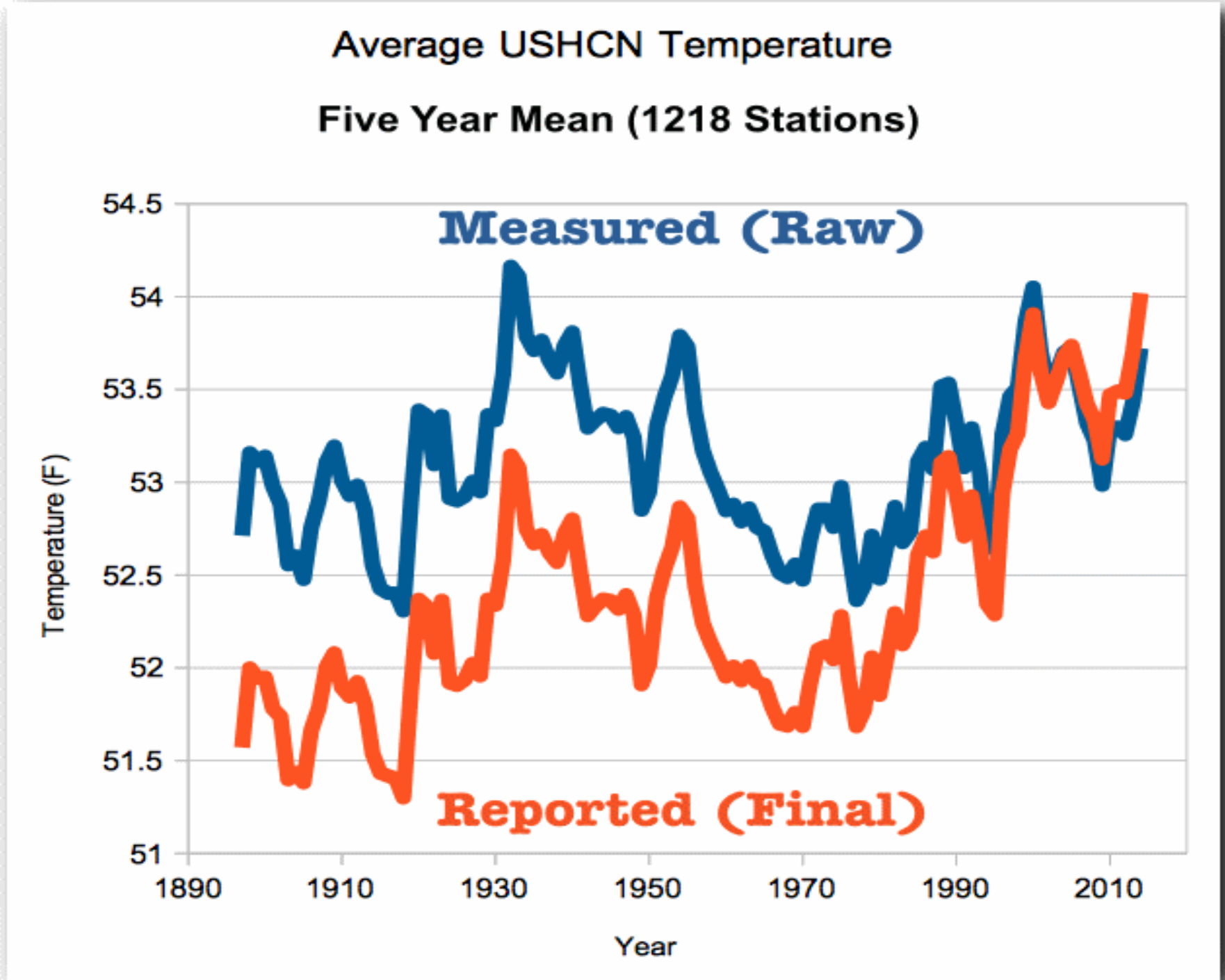
FIGURE 2

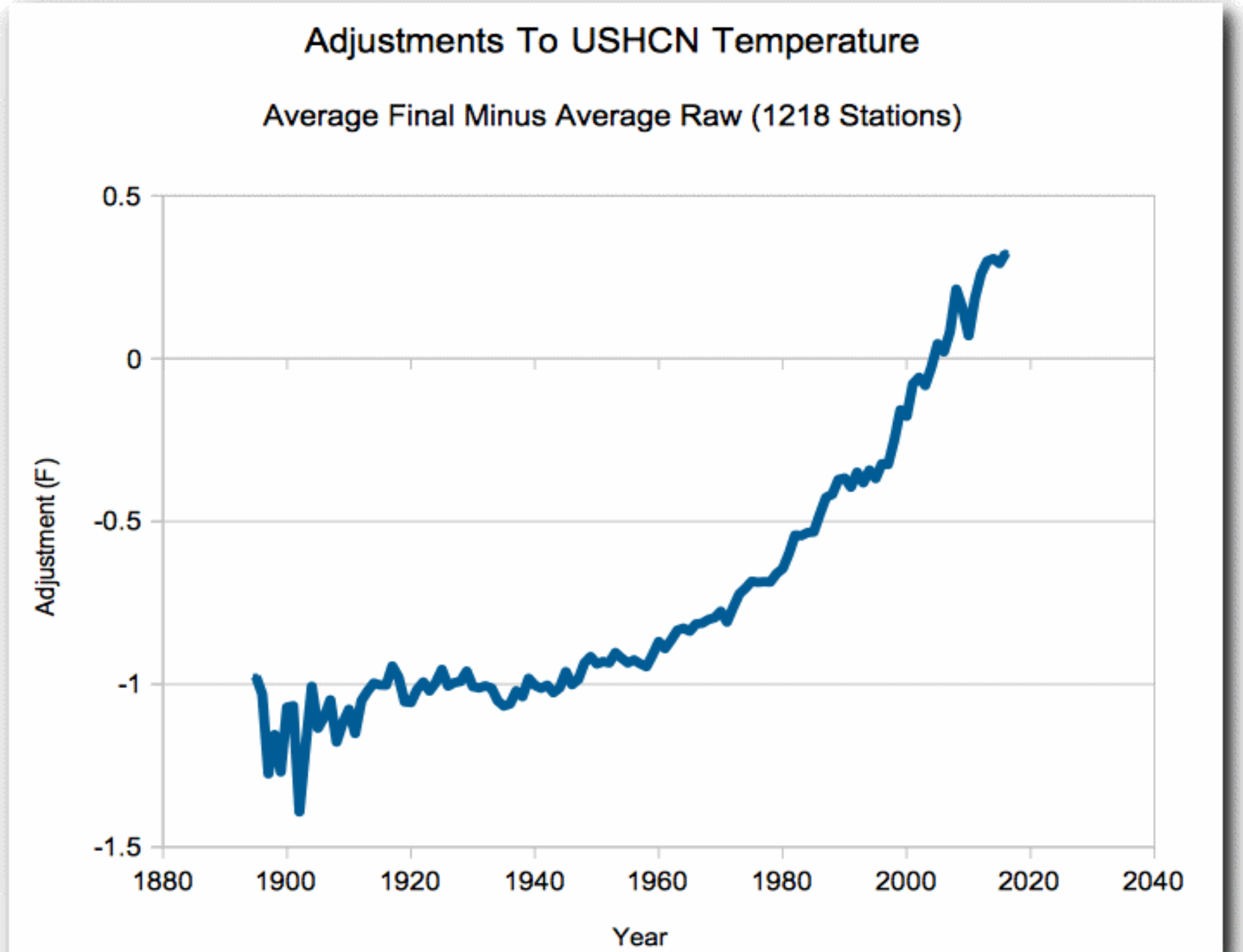

U.S. Temperature - As Presented in 1999
Temperature Anomaly (°C)
1.5
1.0
.5
0
-.5
-1.0
0.6
1880
1900
1920
1940
1960
1980
20

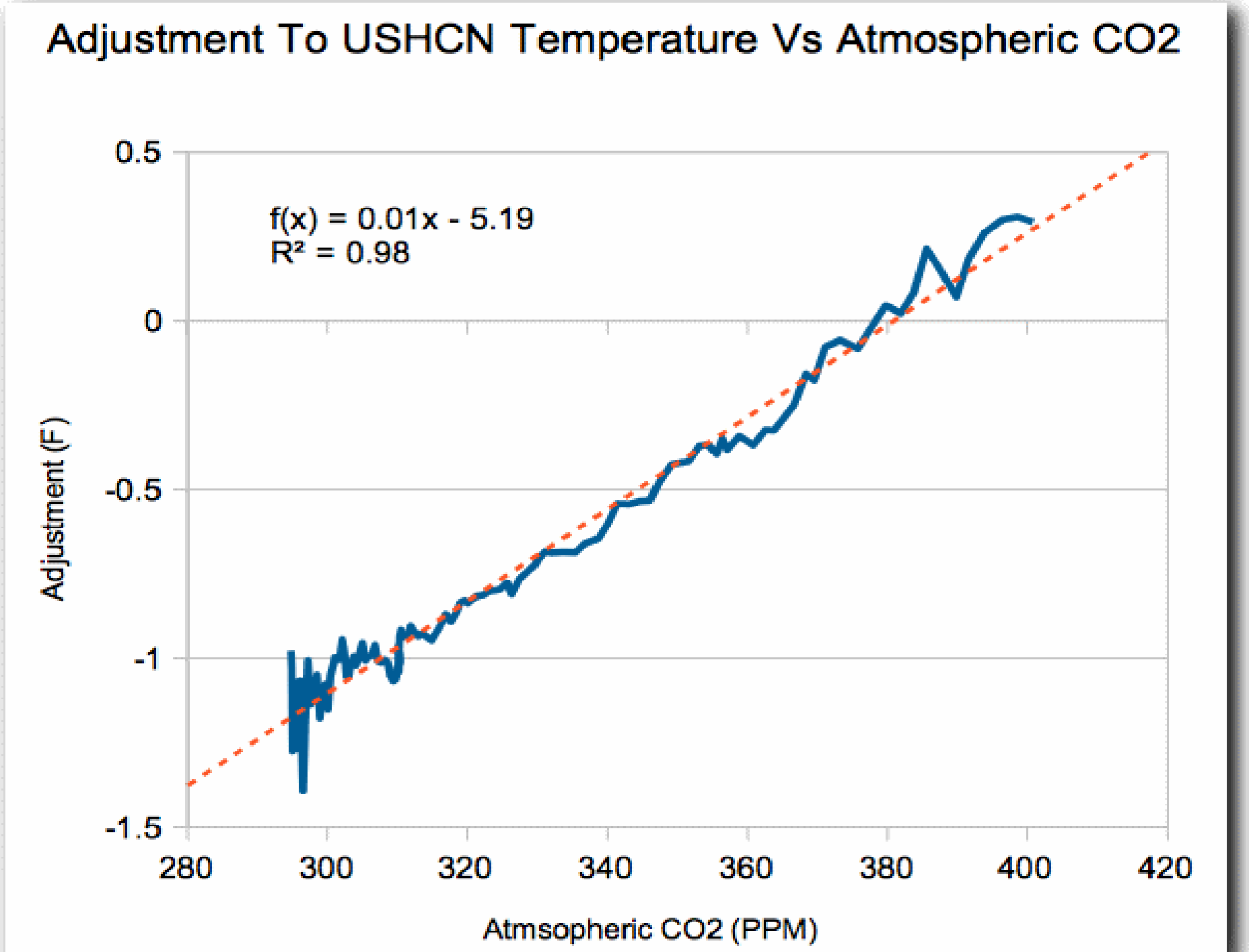

U.S. Temperature - As Presented in 2006
1.5
1.0
.5
0
-.5
-1.0
1880
1900
1920
1940
1960
1980
2000



Net adjustments to historical records of global temperature applied between 2008 and 2012, as produced by the US National Climatic Data Center (NCDC). Middle and below, visualization of step by step adjustments for two specific months, January 1915 and January 2000. Image adapted from an original by professor Ole Humlum.


Average USHCN Temperature
Five Year Mean (1218 Stations)
Measured (Raw)
Reported (Final)
Temperature (F)
54.5
54
53.5
53
52.5
52
51.5
51
1890
1910
1930
1950
1970
1990
2010
Year


Adjustments To USHCN Temperature
Average Final Minus Average Raw (1218 Stations)
0.5
0
-0.5
-1
-1.5
Adjustment (F)
1880
1900
1920
1940
1960
1980
2000
2020
2040
Year


Adjustment To USHCN Temperature Vs Atmospheric CO2
f(x) = 0.01x - 5.19
R² = 0.98
0.5
0
-0.5
-1
-1.5
Adjustment (F)
280
300
320
340
360
380
400
420
Atmsopheric CO2 (PPM)

Satellite Data

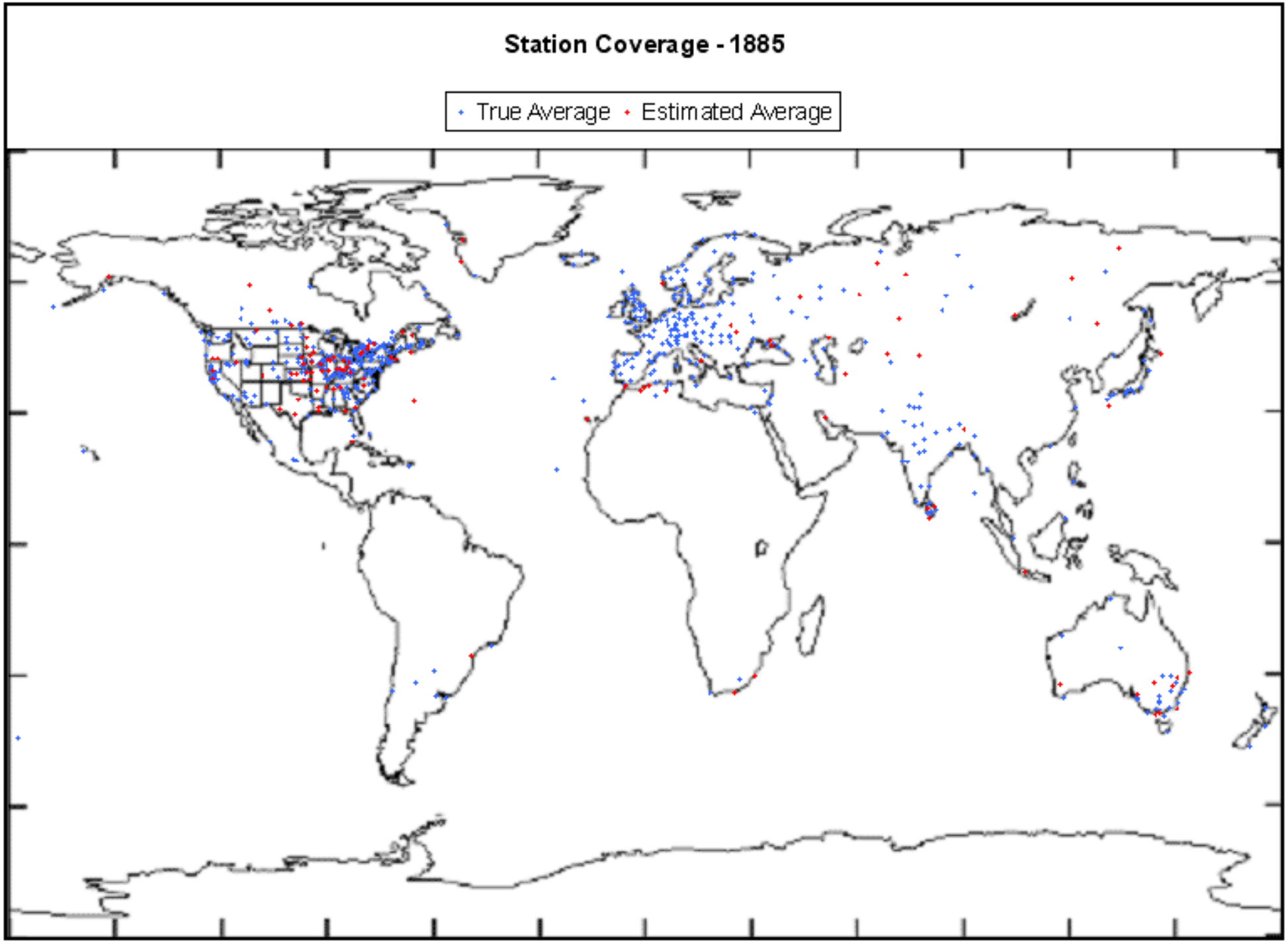
- **UAH** – University of Alabama – Huntsville, analyzes and maintains satellite sensed temperature data
  - **John Raymond Christy** is a climate scientist at the University of Alabama in Huntsville (UAH) whose chief interests are satellite remote sensing of global climate and global climate change. He is best known, jointly with Roy Spencer, for the first successful development of a satellite temperature record
- **RSS** – Remote Sensing System, private company supported by NASA, NOAA and NSF. Recently revised historical satellite data upwards

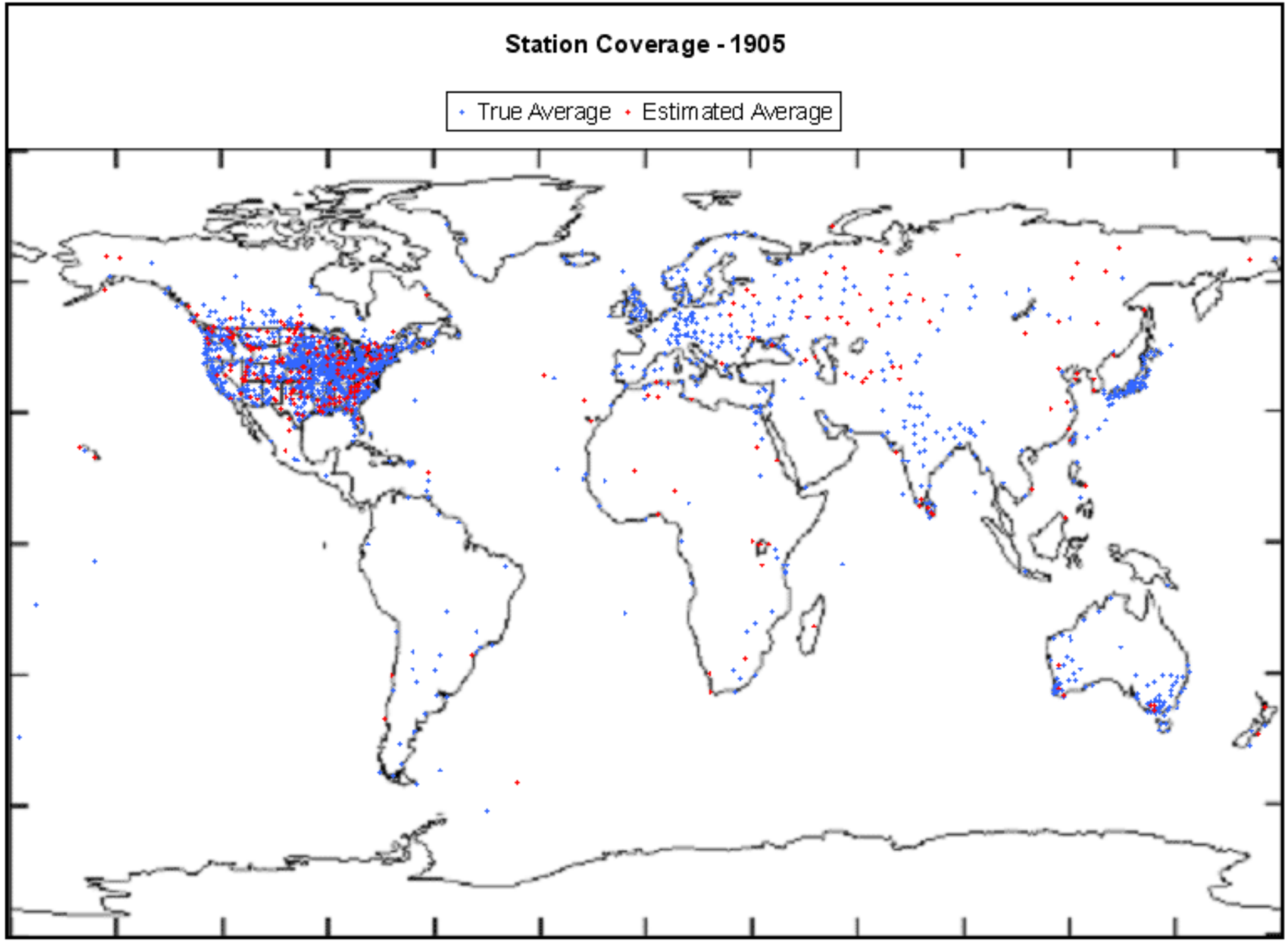
Central England Temperature

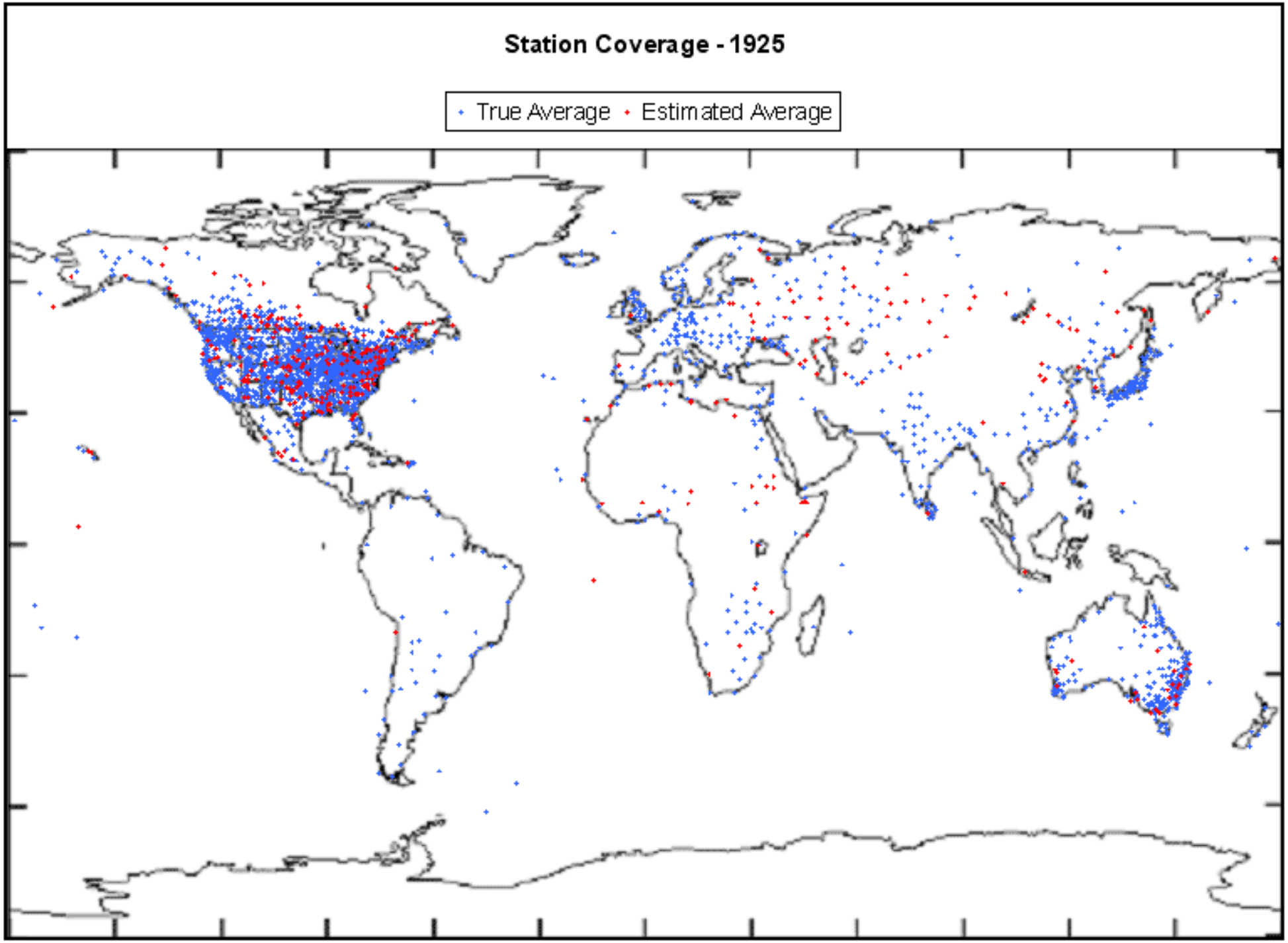
- CET data has been collected in Central England since 1659

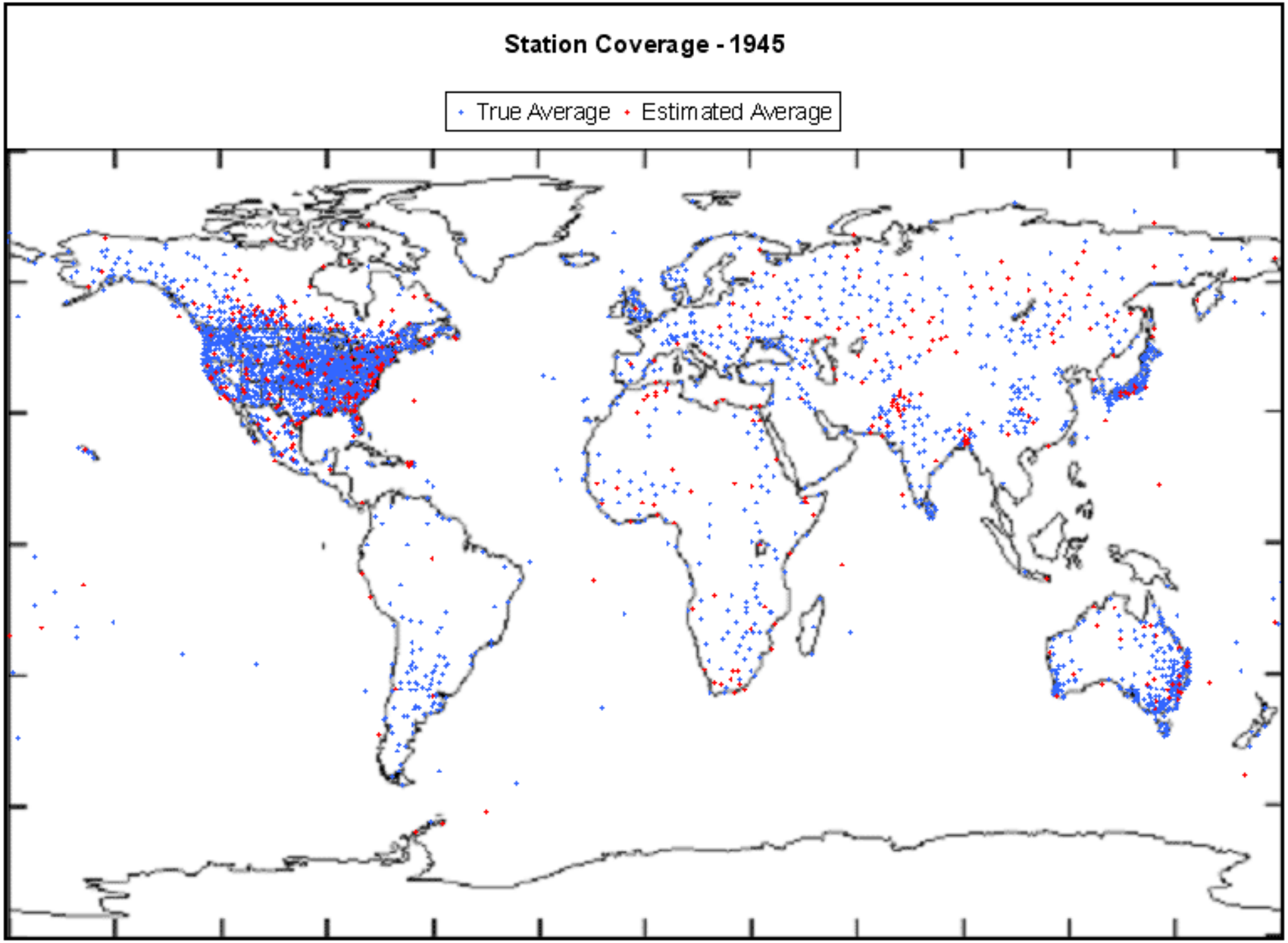
- These daily and monthly temperatures are representative of a roughly triangular area of the United Kingdom enclosed by Lancashire, London and Bristol. The monthly series, which begins in 1659, is the longest available instrumental record of temperature in the world. The daily mean-temperature series begins in 1772.

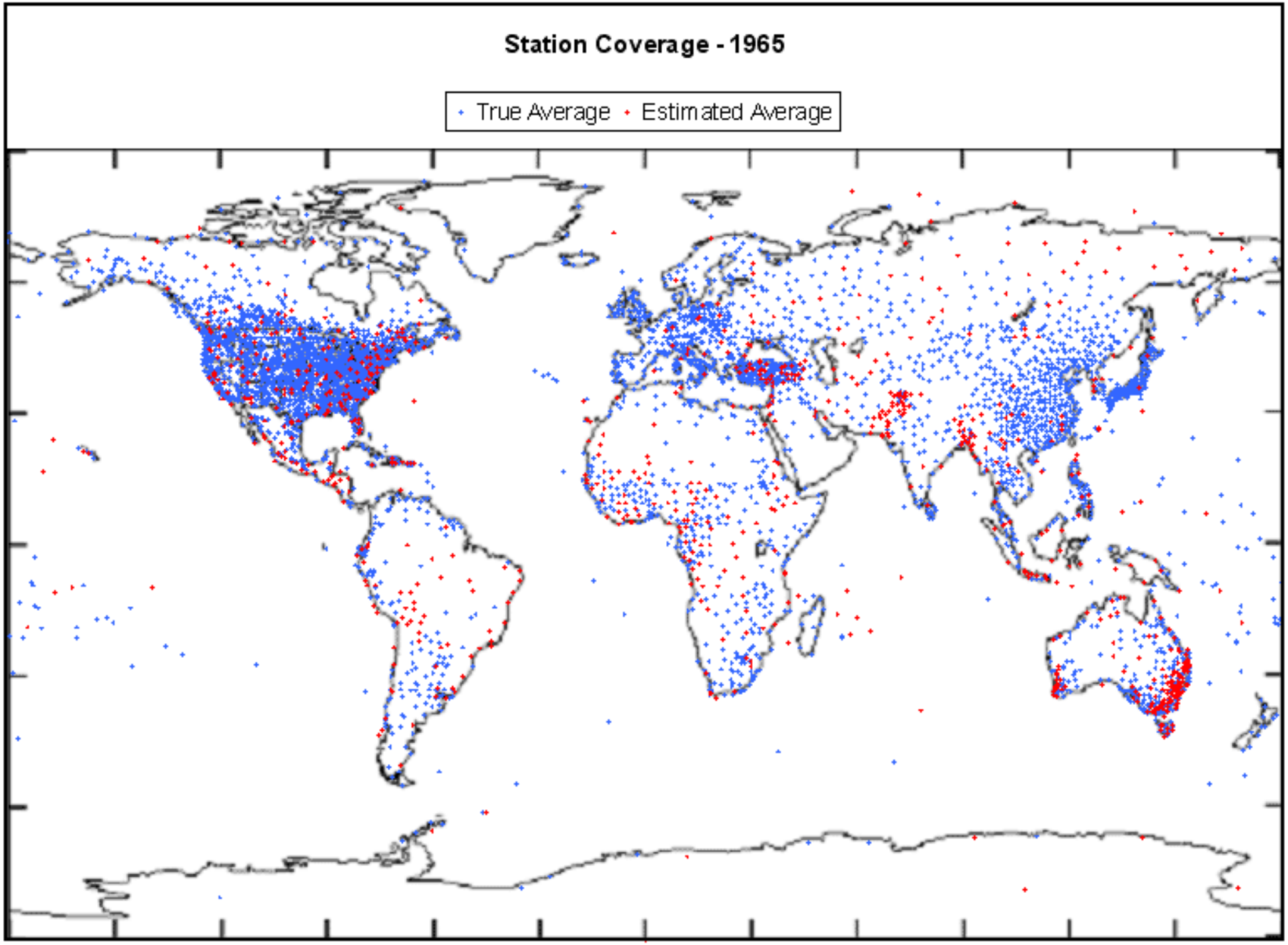
- The Central England Temperature record is a meteorological dataset originally published by Professor Gordon Manley in 1953 and subsequently extended and updated in 1974, following many decades of painstaking work

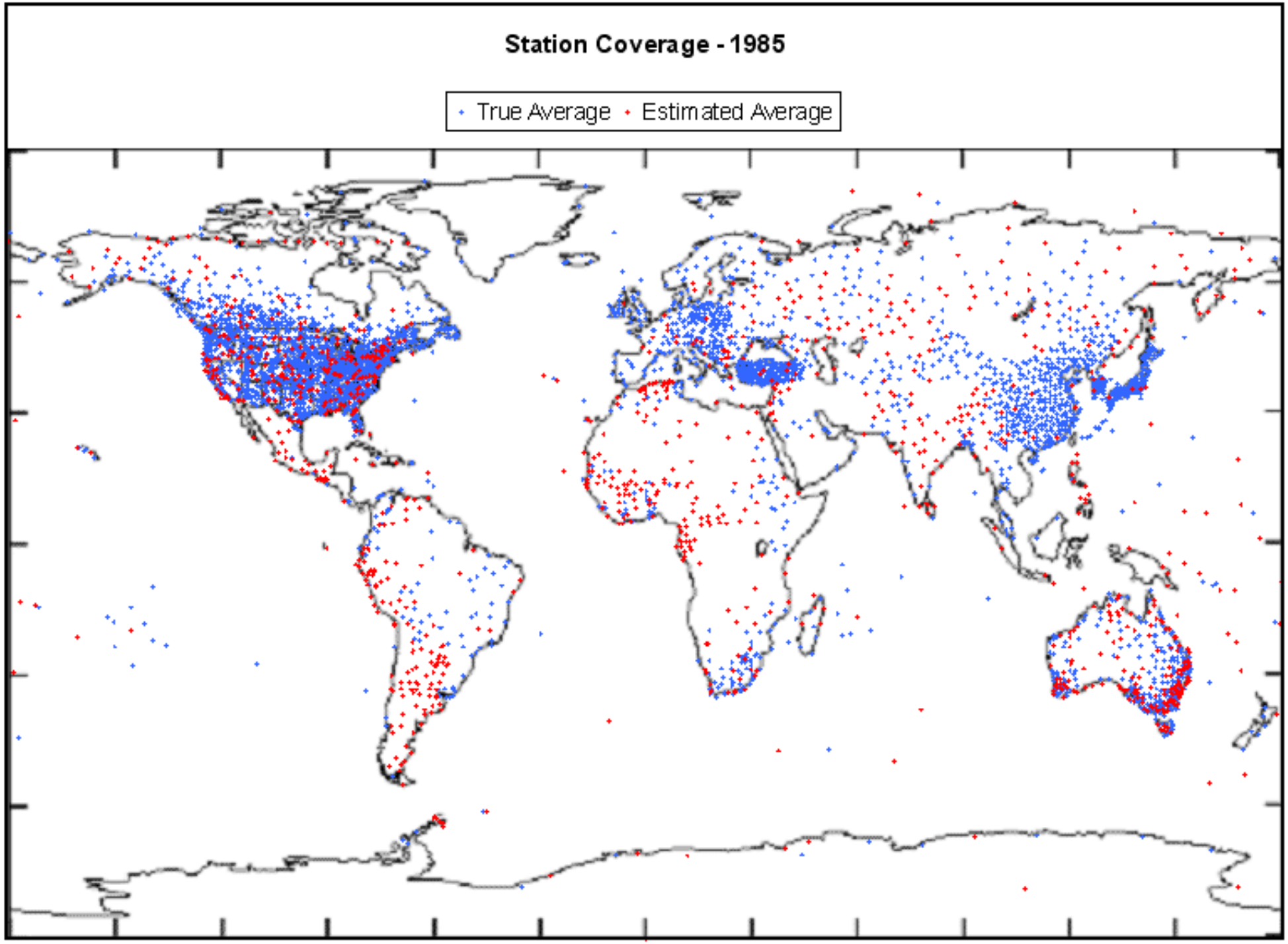

Station Coverage - 1885
True Average
Estimated Average

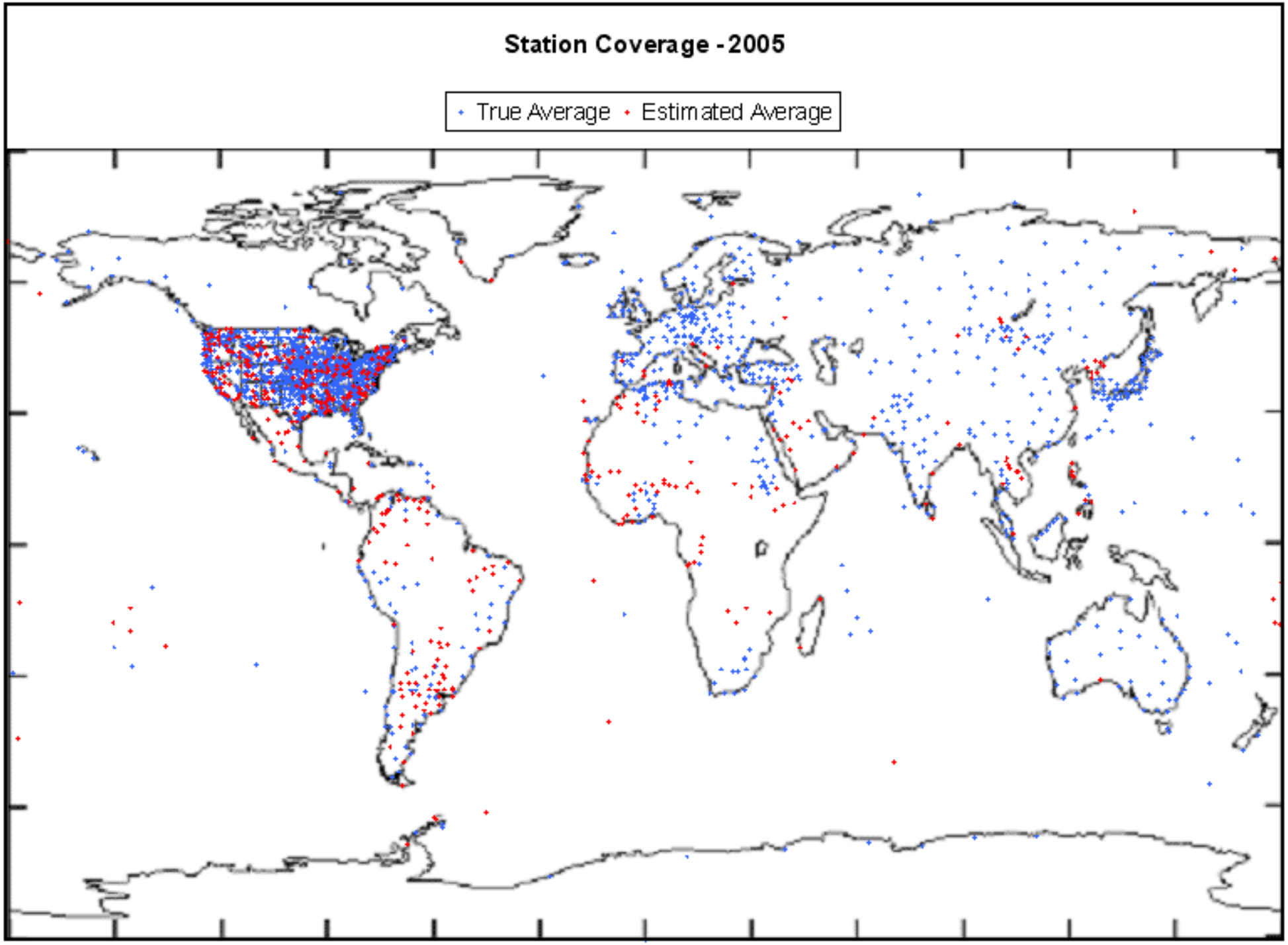

Station Coverage - 1905
True Average
Estimated Average

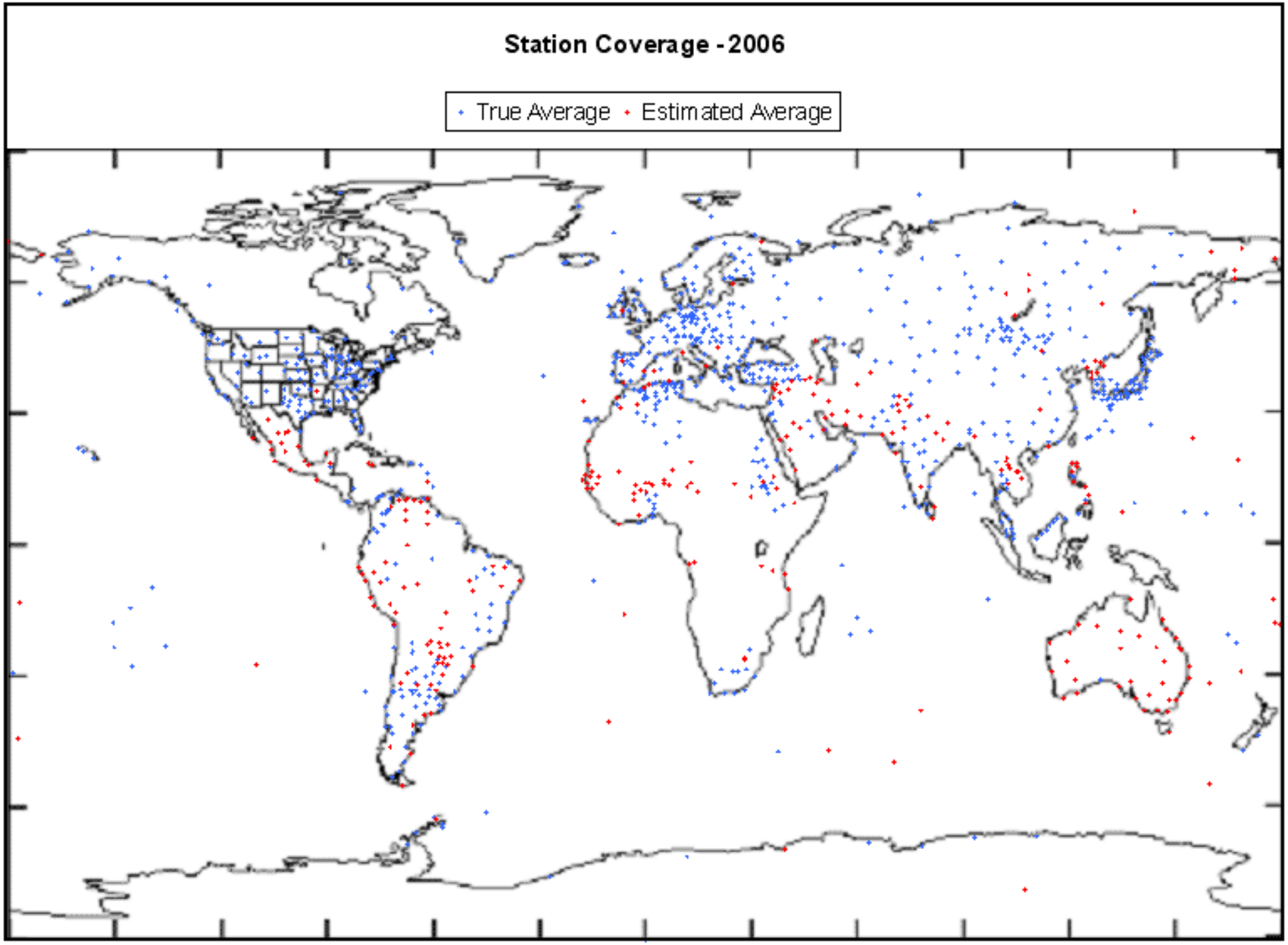

Station Coverage - 1925
True Average
Estimated Average


Station Coverage - 1945
True Average
Estimated Average


Station Coverage - 1965
True Average
Estimated Average


Station Coverage - 1985
True Average
Estimated Average


Station Coverage - 2005
True Average
Estimated Average

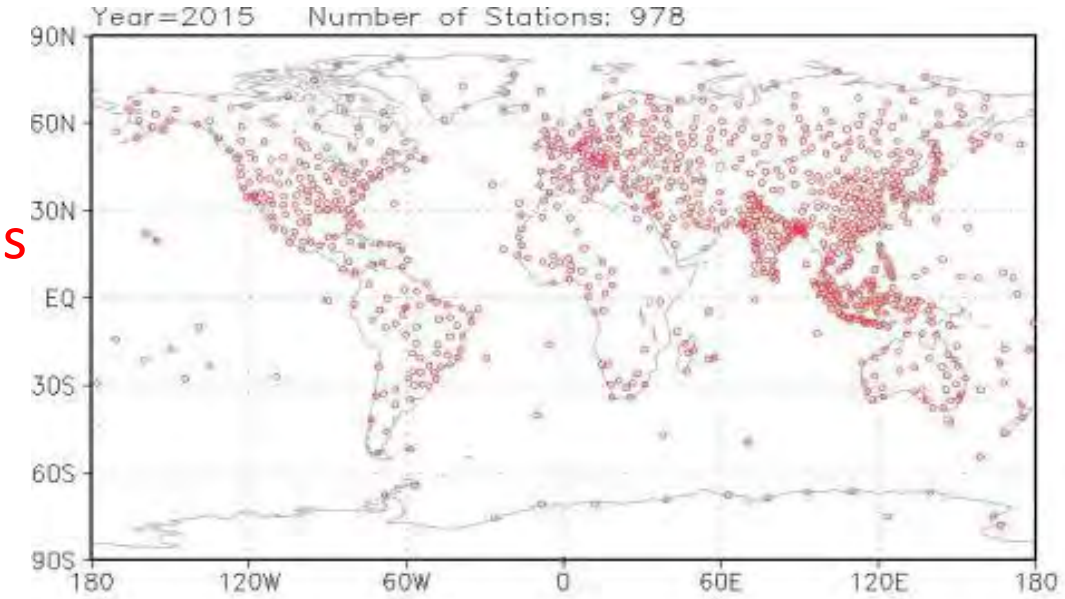

Station Coverage - 2006
True Average
Estimated Average

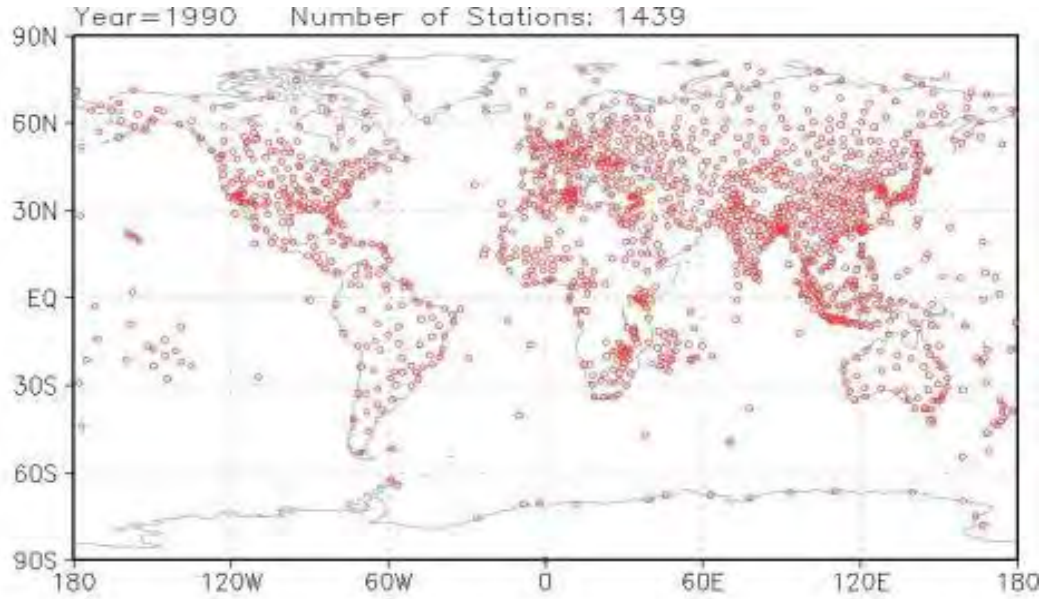
Weather Balloons & Radiosondes

- Weather balloons are released twice each day of the year (noon and midnight GMT) from almost 900 sites world-wide.
- They carry radiosondes and rise to over 100,000 feet.
- They measure temperature, pressure, relative humidity, and radio the data every one or two seconds over the approximately 2 hr. flight.
- They are tracked to determine wind speed and direction

Weather Balloons – World-wide stations

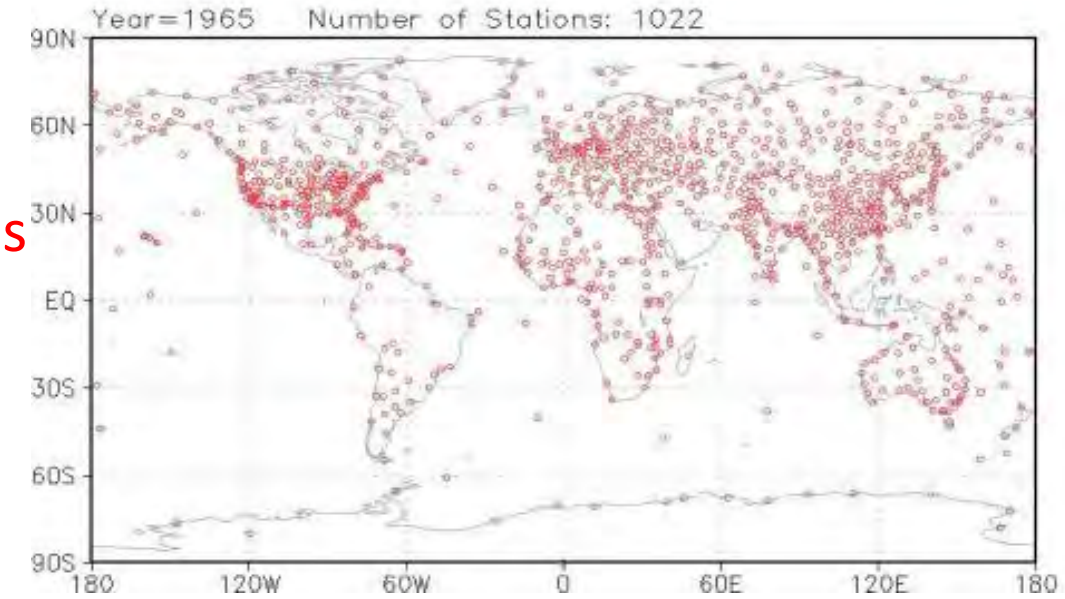
2015
978
stations

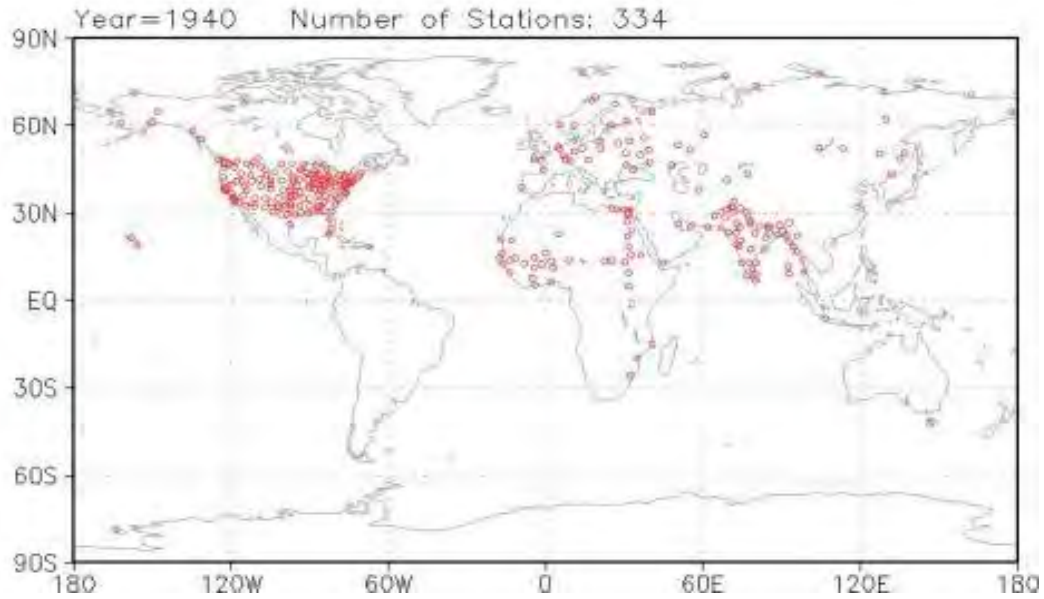




1990
1439
stations

1965
1022
stations





1940
334
stations

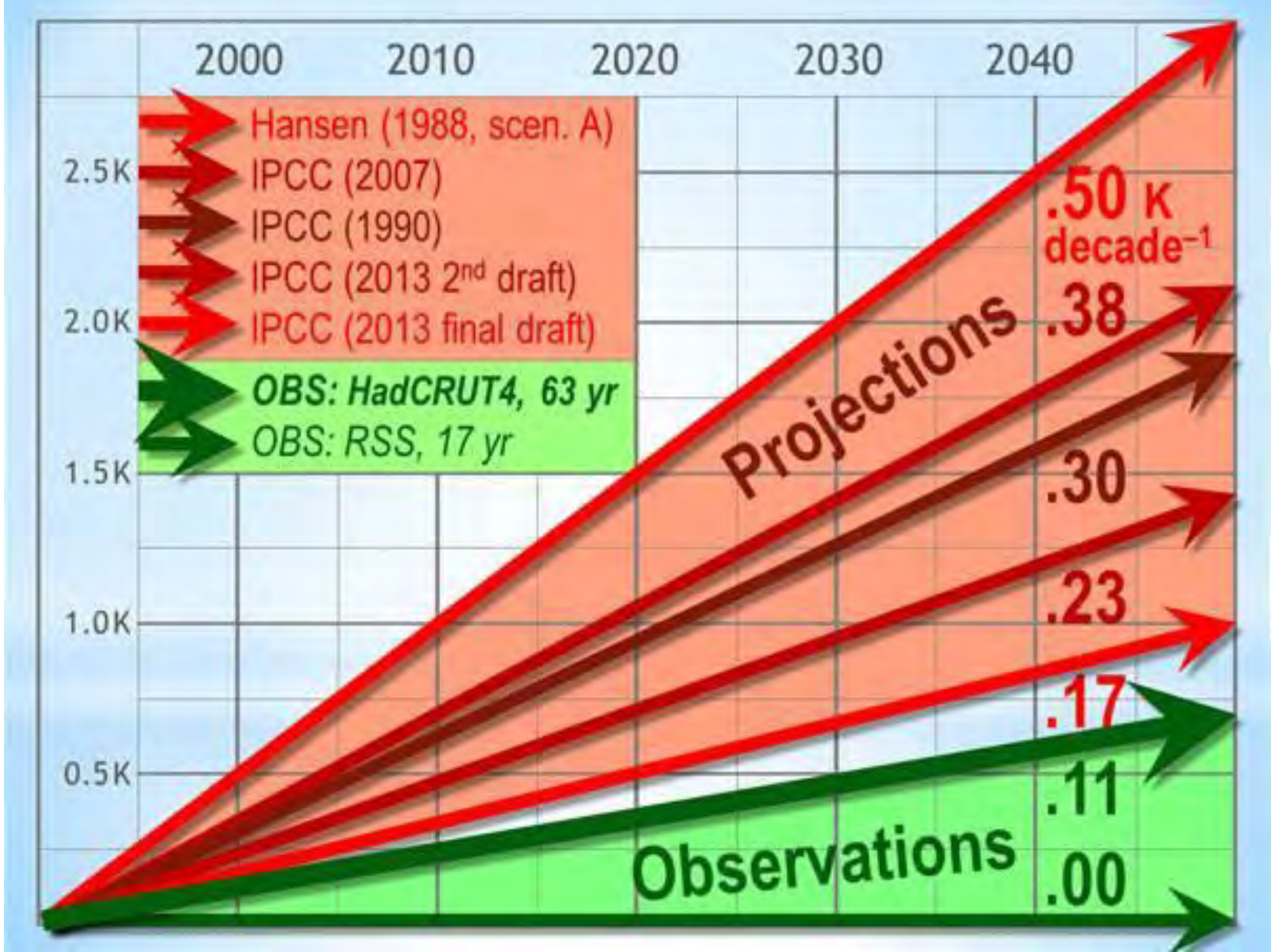
Predictions

- **Warmists:**
  - Based on computer models, temperatures will rise a specific amount, storms will become more severe, droughts will increase, sea level rise will accelerate, polar ice caps will decrease and more

- **Skeptics:**
  - Some warming will occur, but nothing extraordinary, and not unprecedented in recent history

40 Years of Observation

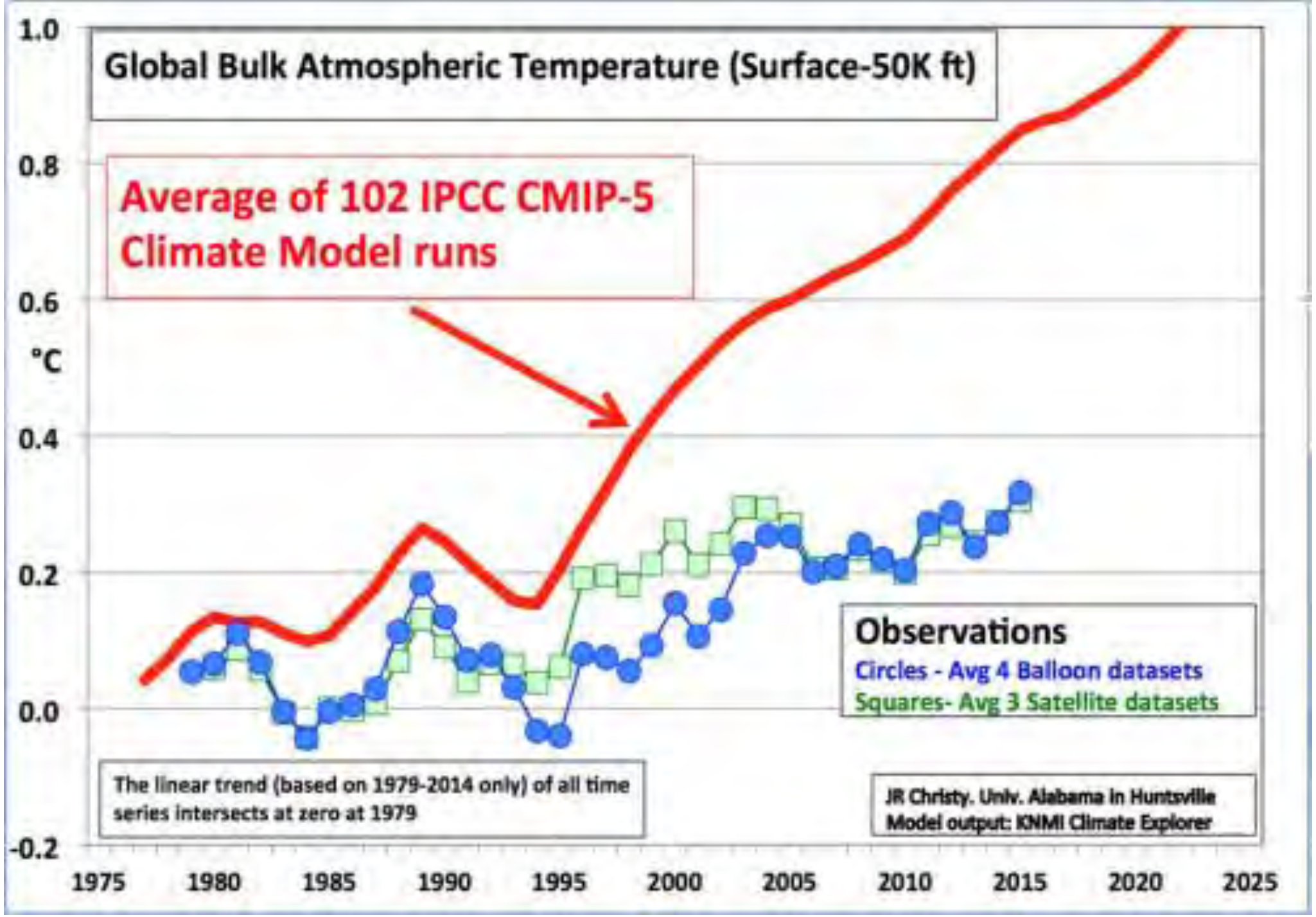
- The warmists are wrong.
  - There has been no increase in observed water vapor
  - There has been no observed “tropic hot spot”, necessary if the increased water vapor hypothesis were correct
  - All their forecasts have failed
- The observed temperature increase is in agreement with the skeptics’ model

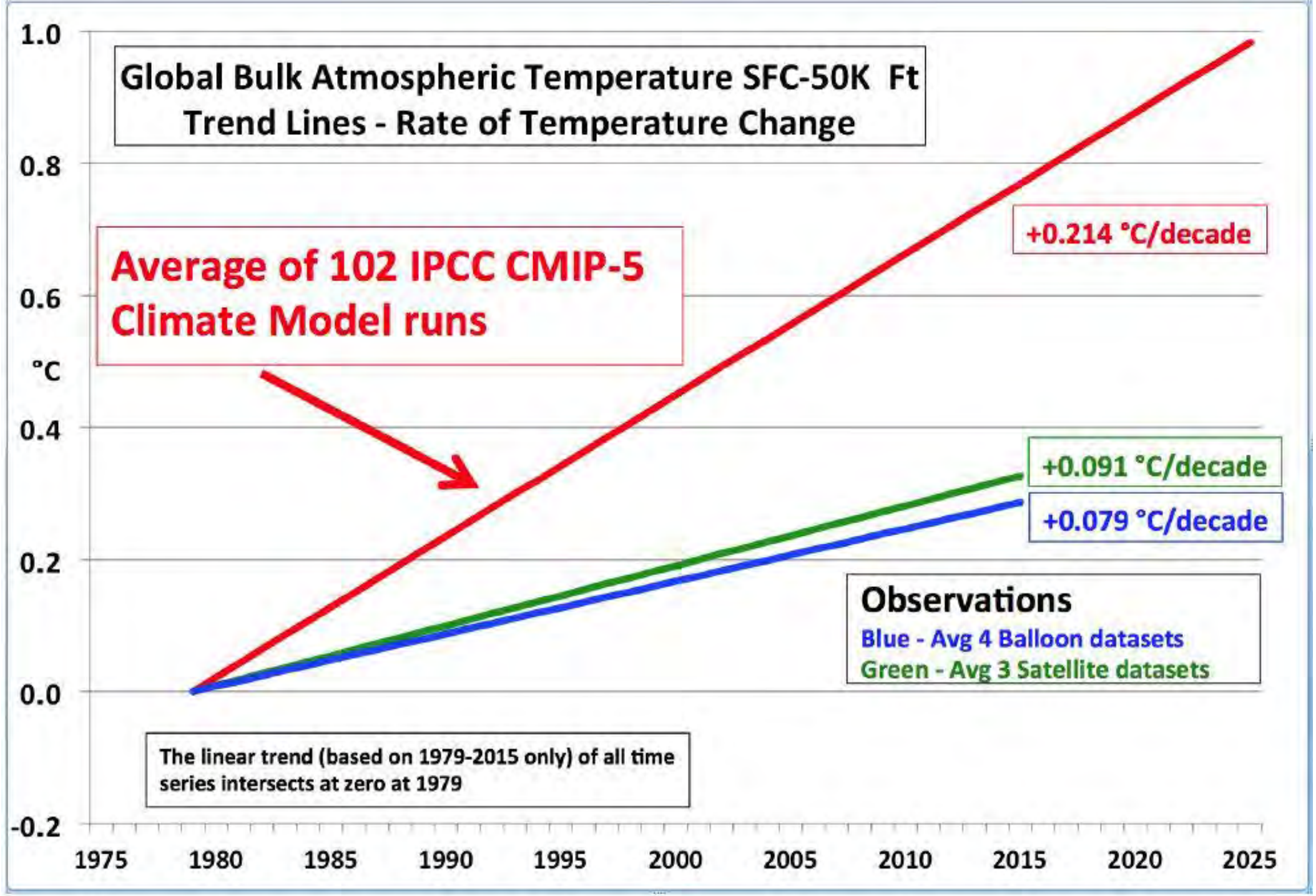

2000
2010
2020
2030
2040
2.5K
2.0K
1.5K
1.0K
0.5K
Hansen (1988, scen. A)
IPCC (2007)
IPCC (1990)
IPCC (2013 2nd draft)
IPCC (2013 final draft)
OBS: HadCRUT4, 63 yr
OBS: RSS, 17 yr
Projections
Observations
.50 K decade−1
.38
.30
.23
.17
.11
.00

- Five projections of global warming, 1990-2050, compared with the linear trends on two observed datasets. IPCC projections are mid-range estimates.
- The trend (green) on the HadCRUt4 monthly global mean surface temperature anomalies reflects the warming at 0.11K/decade observed since 1950.
- The trend (dark green) on the RSS satellite data reflects the zero trend that has now persisted for more than 17 years. Both observed trends are extrapolated to 2050.

Failed Projections

- Global temperature rise in accordance with the hypothesis
- Tropospheric tropical “hot spot”
- Increased storms, tornadoes and hurricanes
- Increased drought
- Decreased snowfall
- Disappearance of polar ice
- Acceleration of ocean rise
- Radiation to space details


Global Bulk Atmospheric Temperature (Surface-50K ft)
Average of 102 IPCC CMIP-5 Climate Model runs
Observations
Circles - Avg 4 Balloon datasets
Squares- Avg 3 Satellite datasets
The linear trend (based on 1979-2014 only) of all time series intersects at zero at 1979
JR Christy. Univ. Alabama in Huntsville
Model output: KNMI Climate Explorer
°C
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025


Global Bulk Atmospheric Temperature SFC-50K Ft
Trend Lines - Rate of Temperature Change
Average of 102 IPCC CMIP-5 Climate Model runs
+0.214 °C/decade
+0.091 °C/decade
+0.079 °C/decade
Observations
Blue - Avg 4 Balloon datasets
Green - Avg 3 Satellite datasets
The linear trend (based on 1979-2015 only) of all time series intersects at zero at 1979
°C
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025

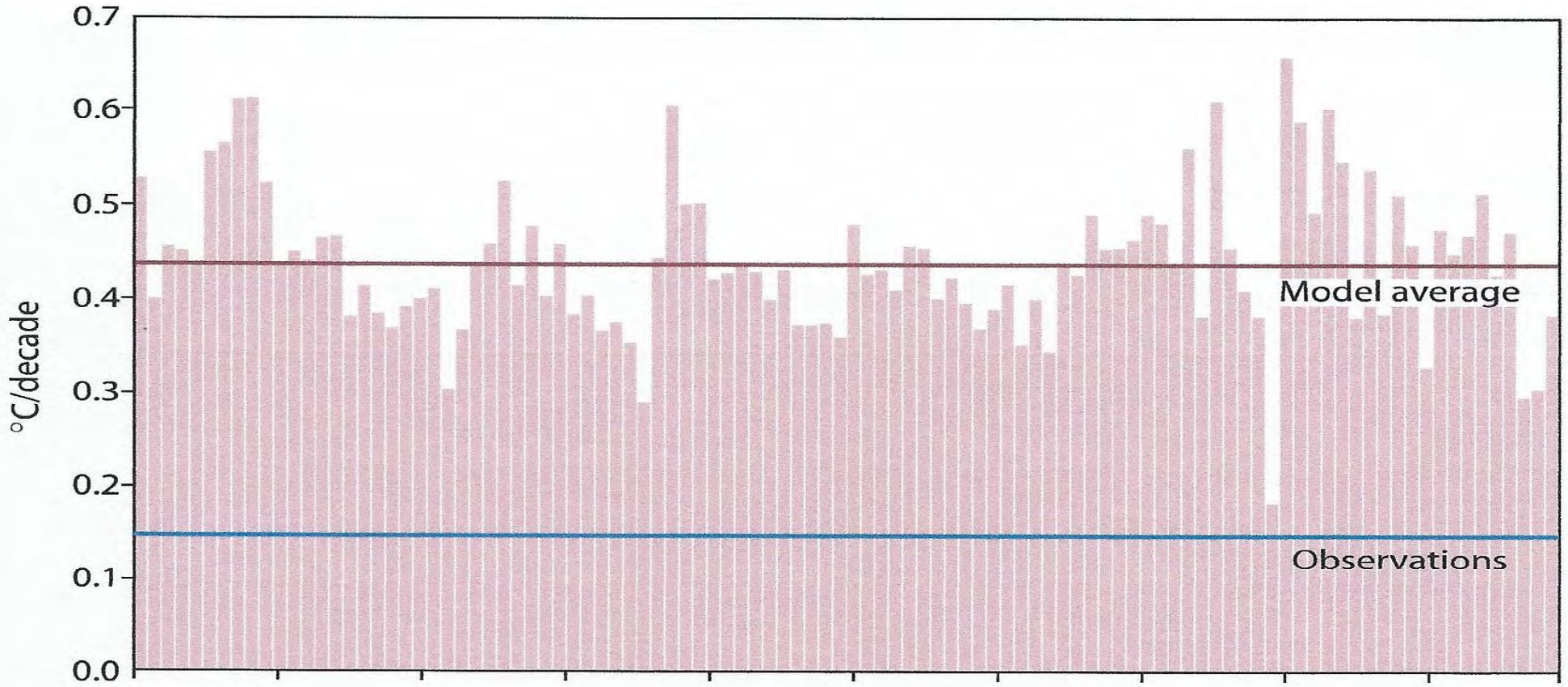


Figure 6: Tropical troposphere warming trends in 102 climate models.
CMIP5 models, trends for 1979–2017, 20°N–20°S, 300-200 hPa.

THE TROPICAL SKIES Falsifying climate alarm John Christy The Global Warming Policy Foundation GWPF Note 17 2019

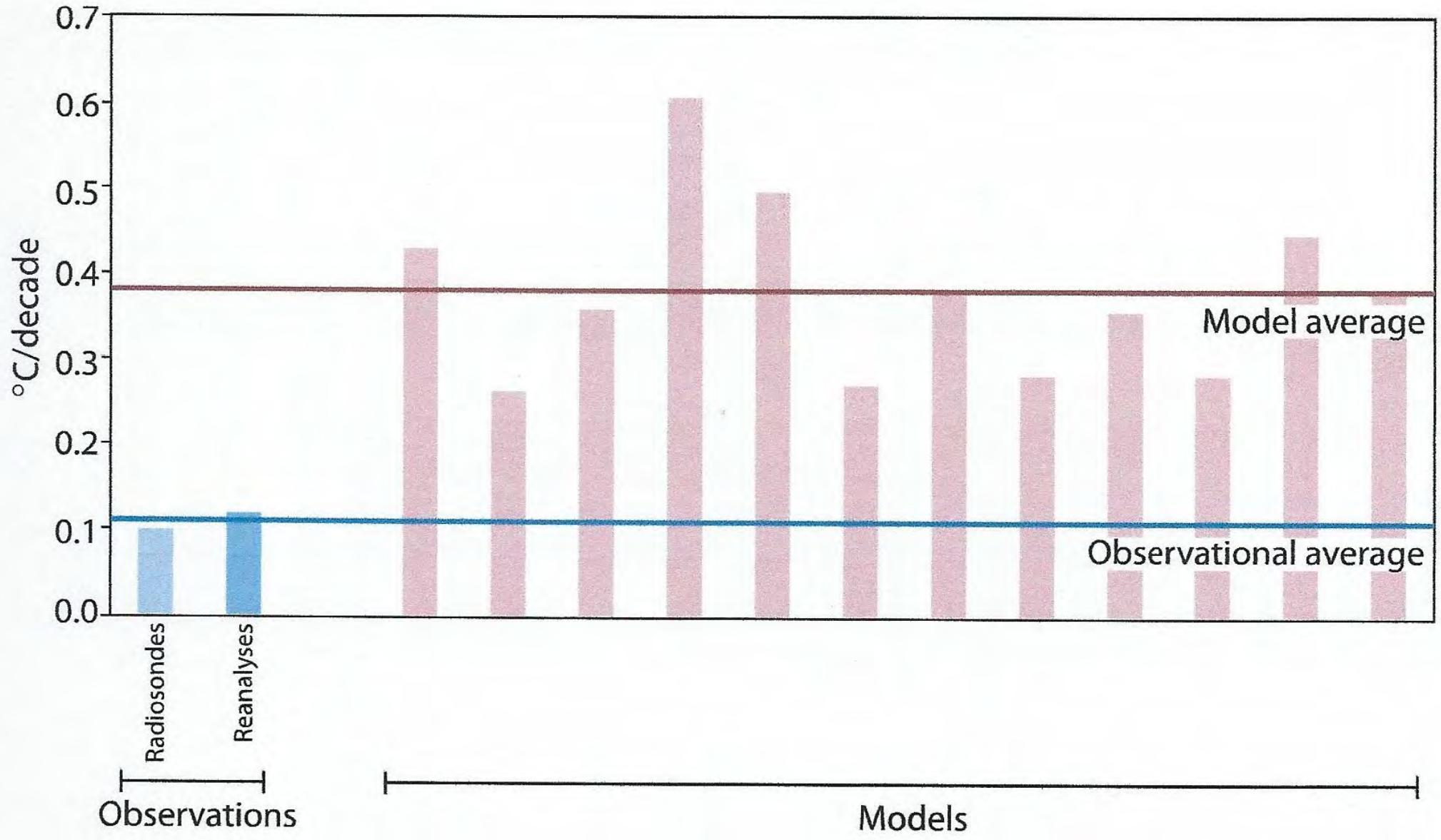
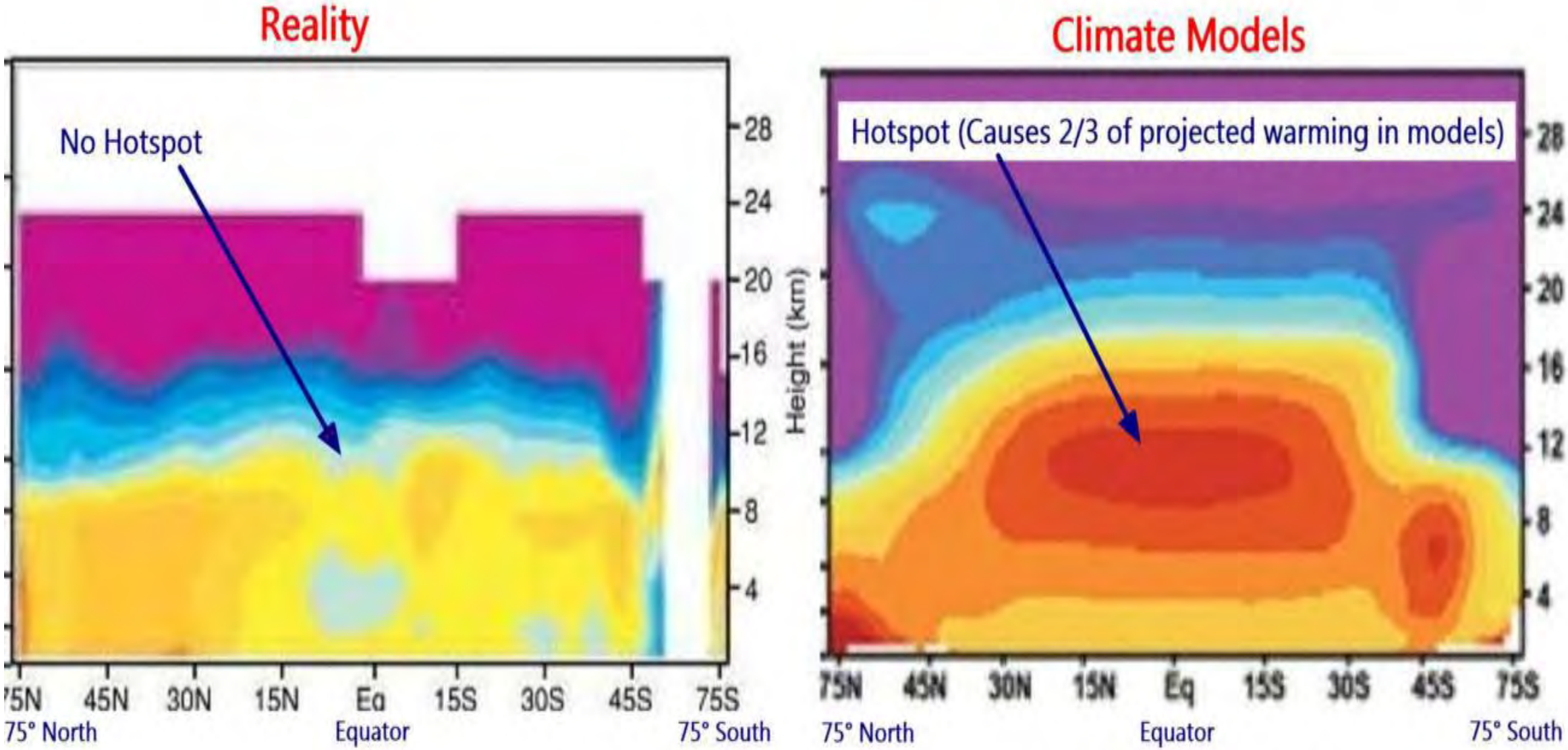
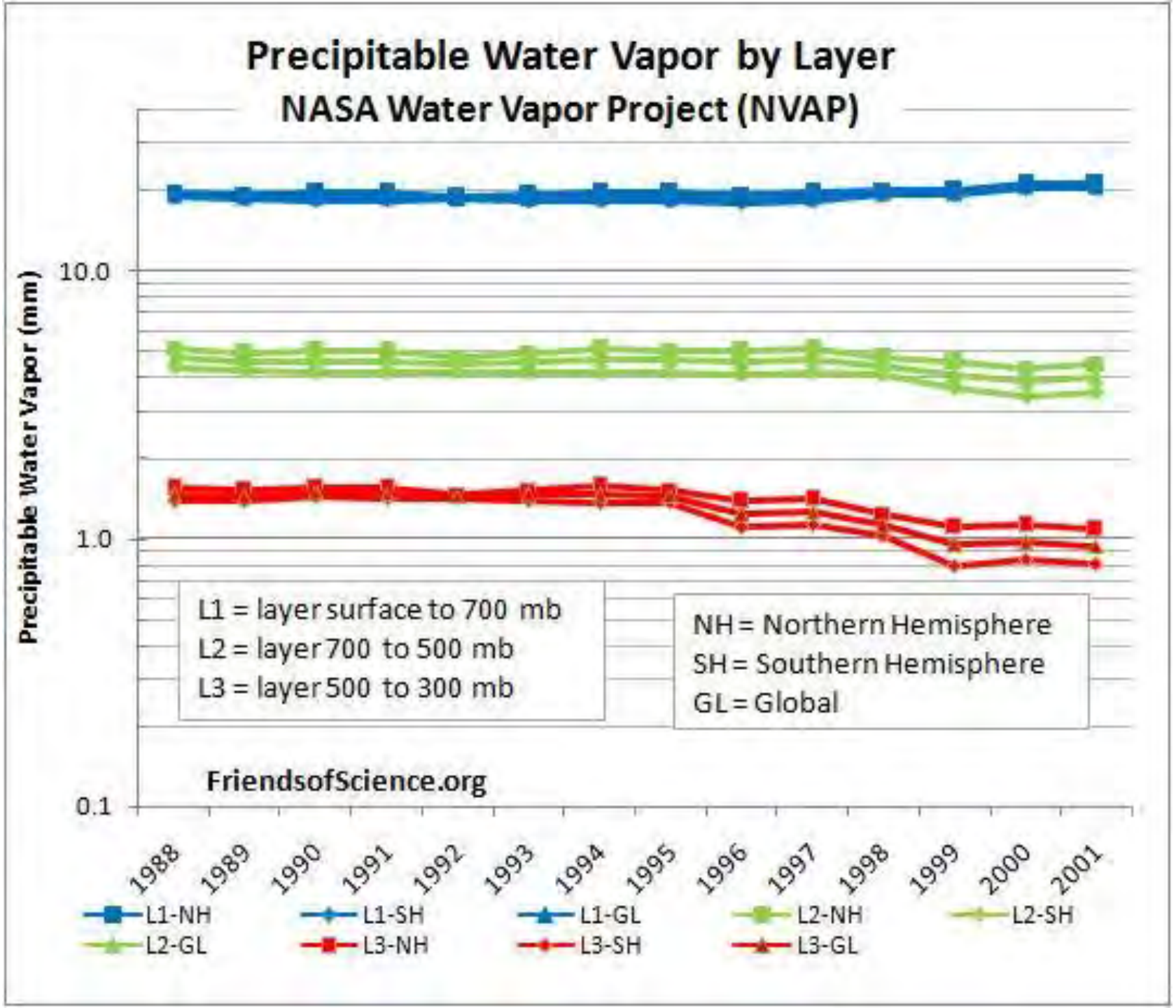


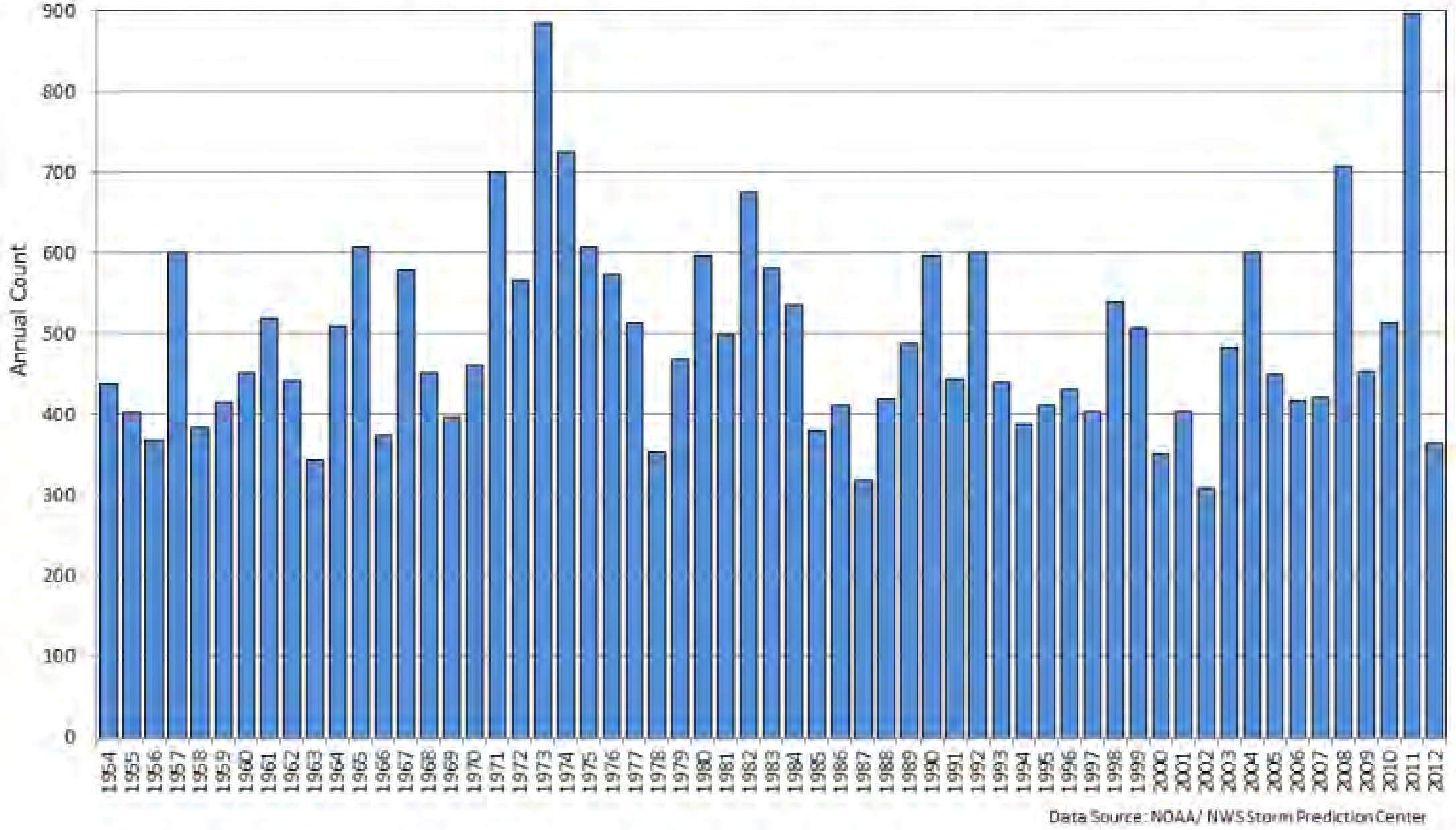
Figure 8: Warming in the tropical troposphere according to the CMIP6 models.
Trends 1979–2014 (except the rightmost model, which is to 2007), for 20°N–20°S, 300–200 hPa.

Atmospheric Warming 1979 - 1999

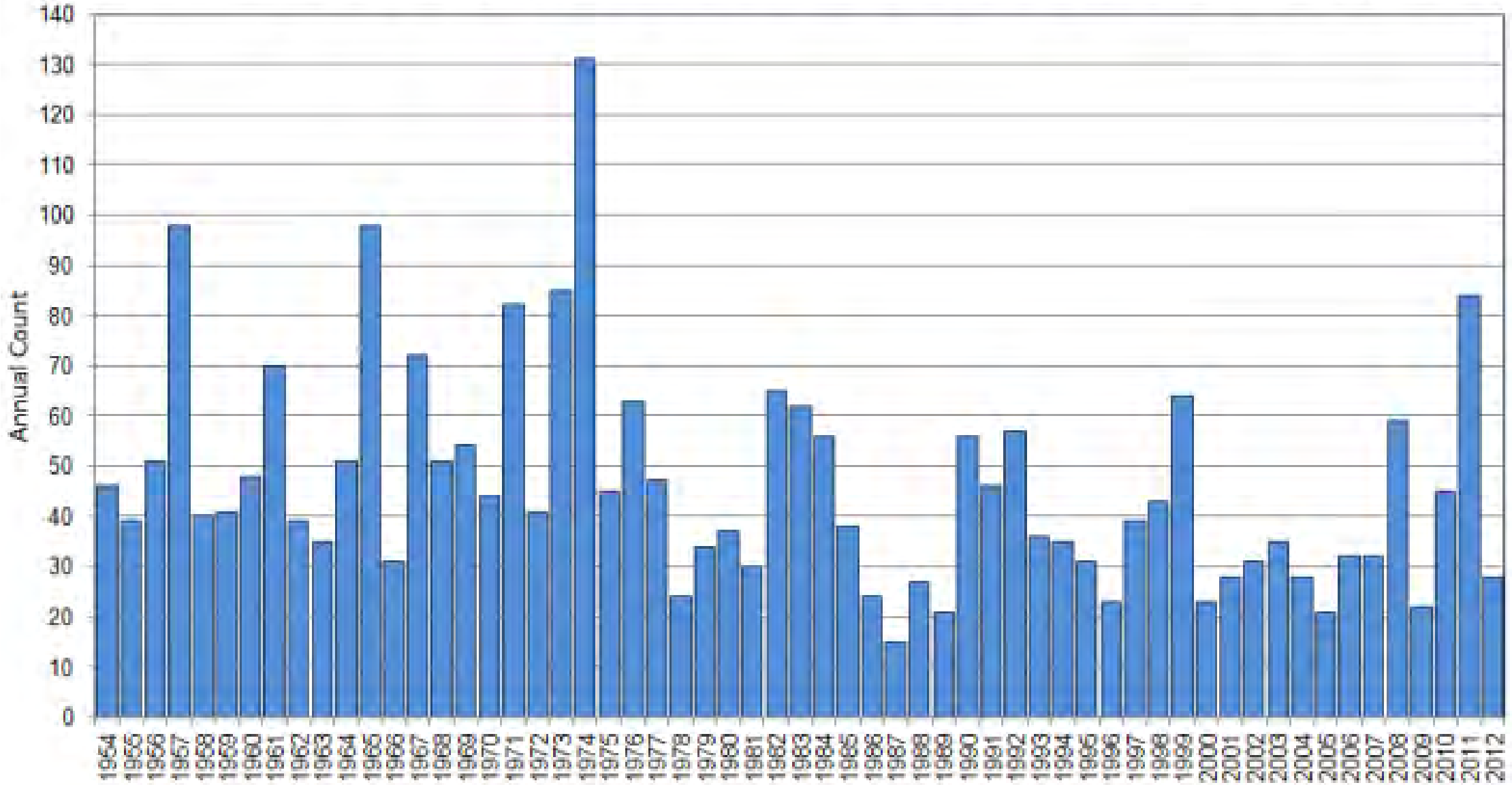



Precipitable Water Vapor by Layer
NASA Water Vapor Project (NVAP)
Precipitable Water Vapor (mm)
10.0
1.0
0.1
L1 = layer surface to 700 mb
L2 = layer 700 to 500 mb
L3 = layer 500 to 300 mb
NH = Northern Hemisphere
SH = Southern Hemisphere
GL = Global
FriendsofScience.org
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
L1-NH
L1-SH
L1-GL
L2-NH
L2-SH
L2-GL
L3-NH
L3-SH
L3-GL

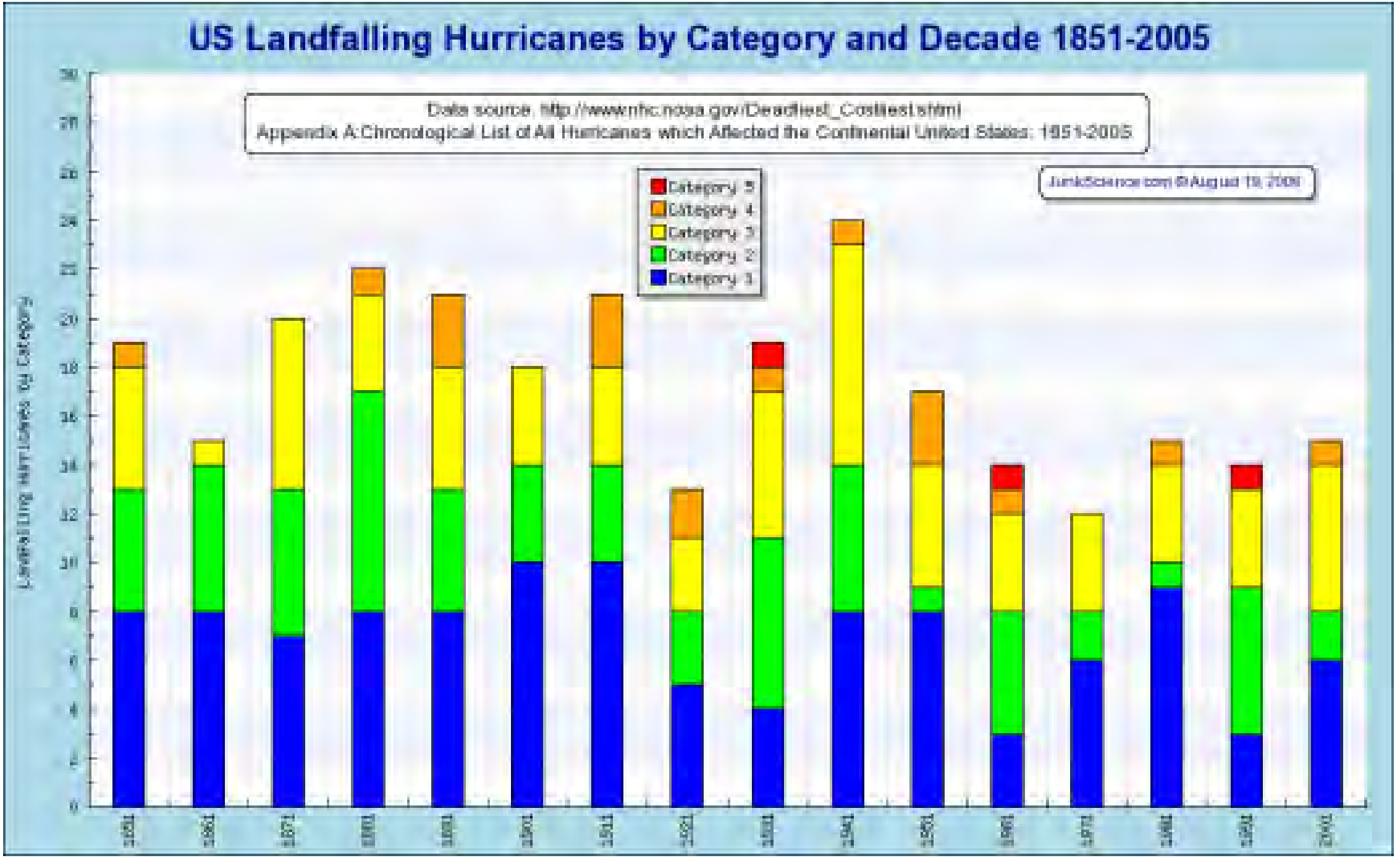
U.S. Annual Count of EF-1+ Tornadoes, 1954 through 2012



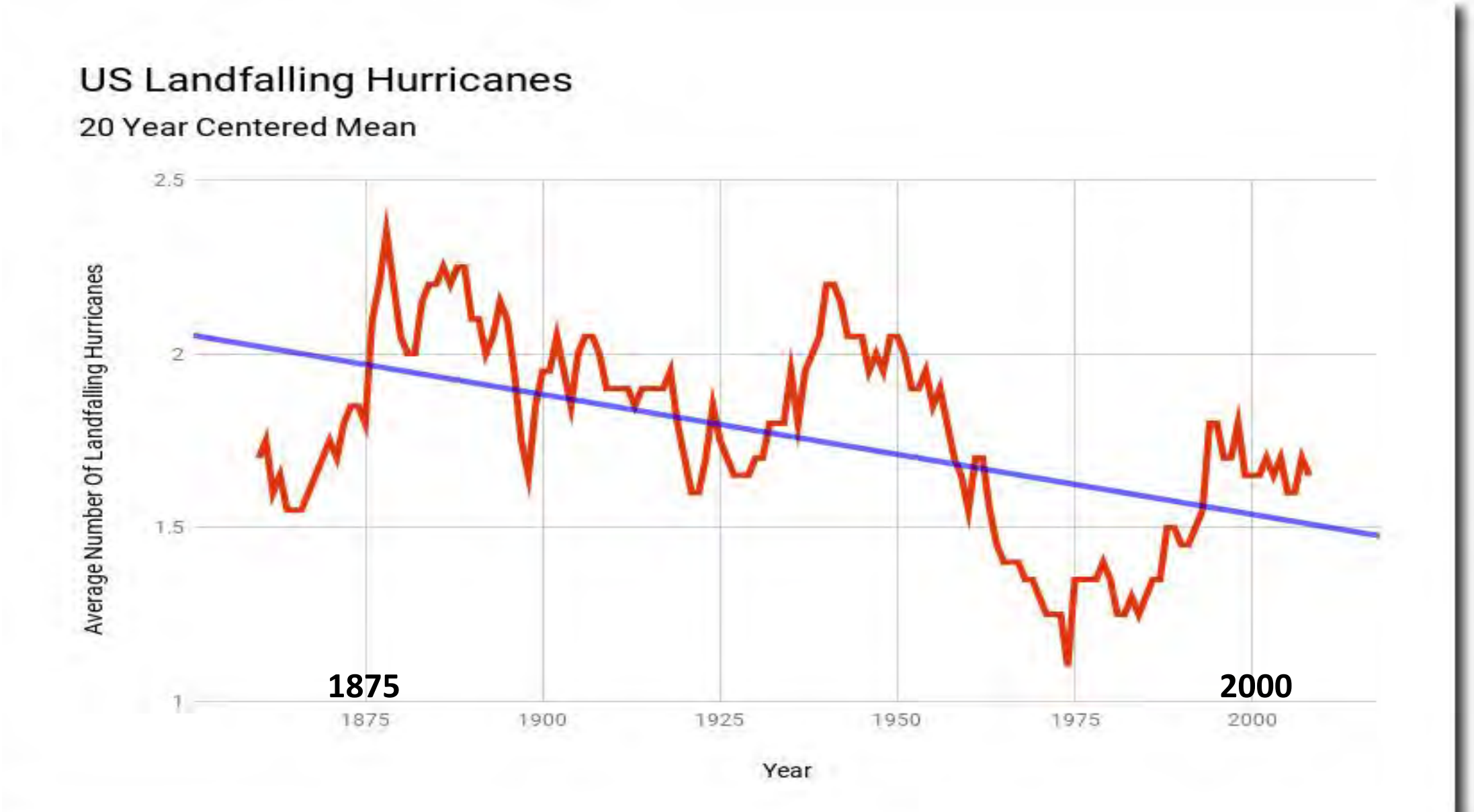
U.S. Annual Count of Strong to Violent Tornadoes (F3+), 1954 through 2012

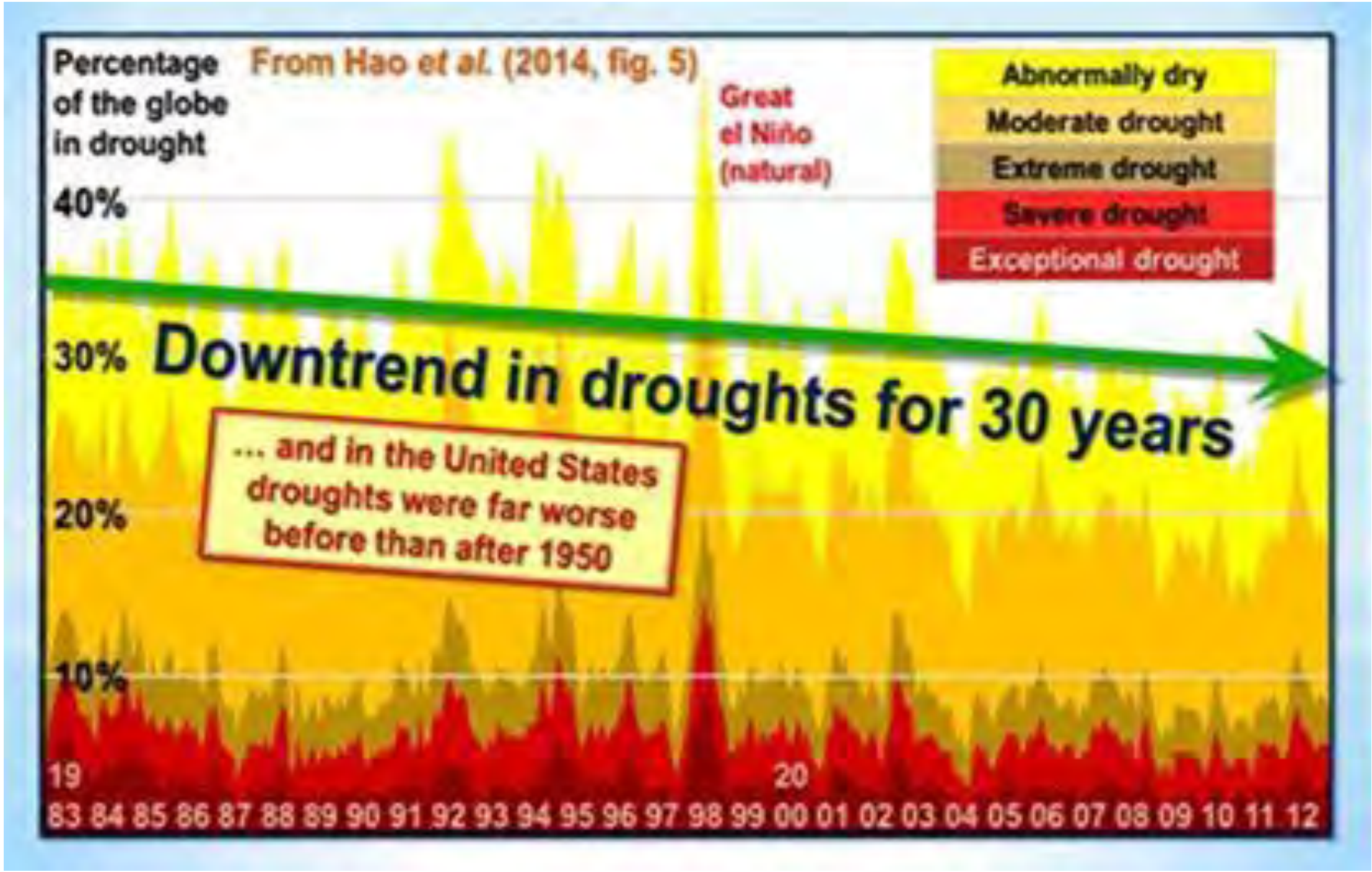


Source: NOAA/NWS Storm Prediction Center

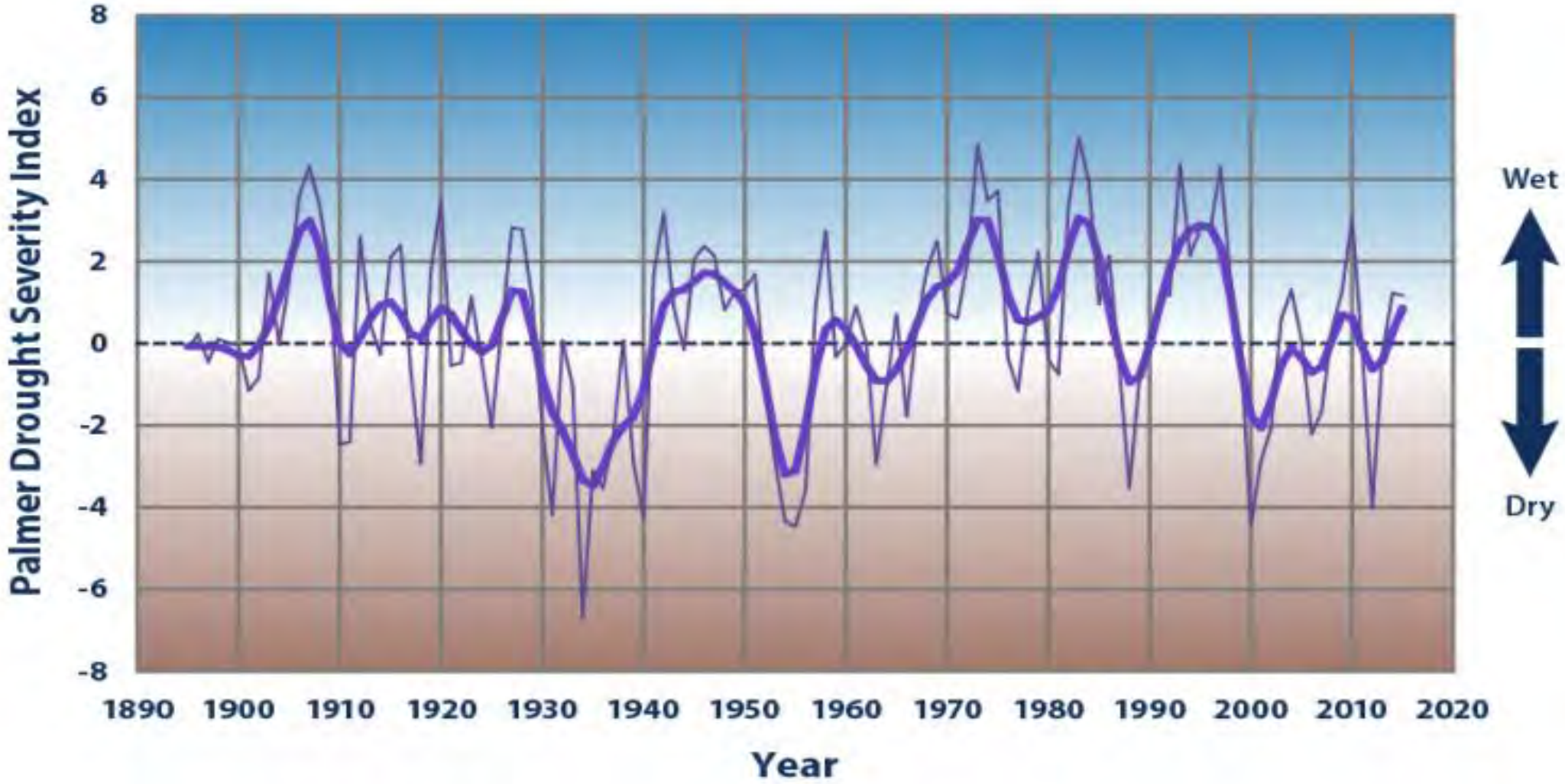

US Landfalling Hurricanes by Category and Decade 1851-2005
Data source: http://www.nhc.noaa.gov/Deadliest_Costliest.shtml
Appendix A:Chronological List of All Hurricanes which Affected the Continental United States: 1851-2005
JunkScience.com © August 19, 2006
Category 5
Category 4
Category 3
Category 2
Category 1
Landfalling Hurricanes by Category

US Landfalling Hurricanes




Percentage of the globe in drought
From Hao et al. (2014, fig. 5)
Great el Niño (natural)
Abnormally dry
Moderate drought
Extreme drought
Severe drought
Exceptional drought
40%
30%
20%
10%
Downtrend in droughts for 30 years
... and in the United States droughts were far worse before than after 1950
19
20
83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12

Average Drought Conditions in the Contiguous 48 States, 1895–2015



Data source: NOAA (National Oceanic and Atmospheric Administration). 2016. National Centers for Environmental Information. Accessed January 2016. www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.js.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

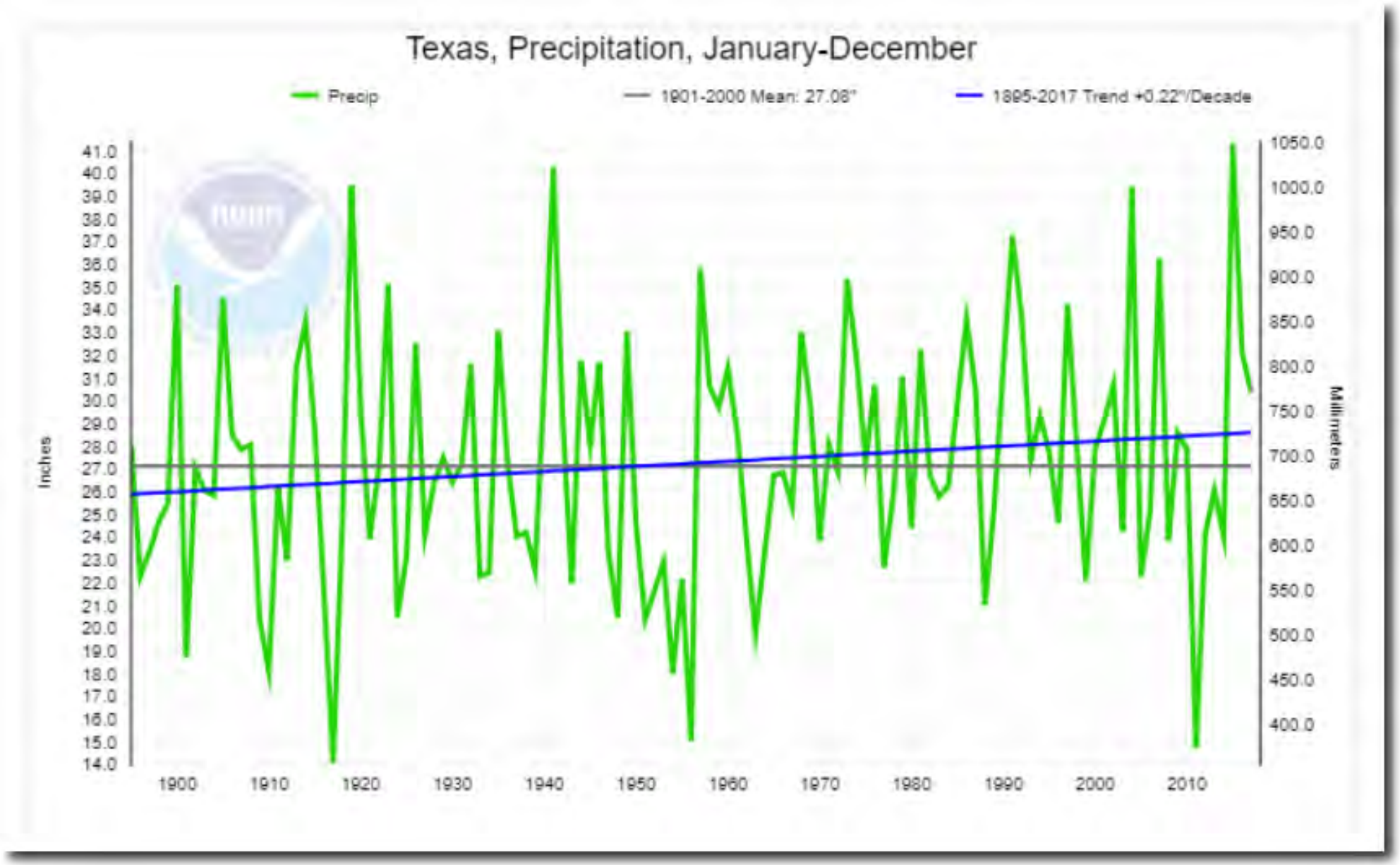
Texas Drought reporting - Aug 2011

THINKPROGRESS

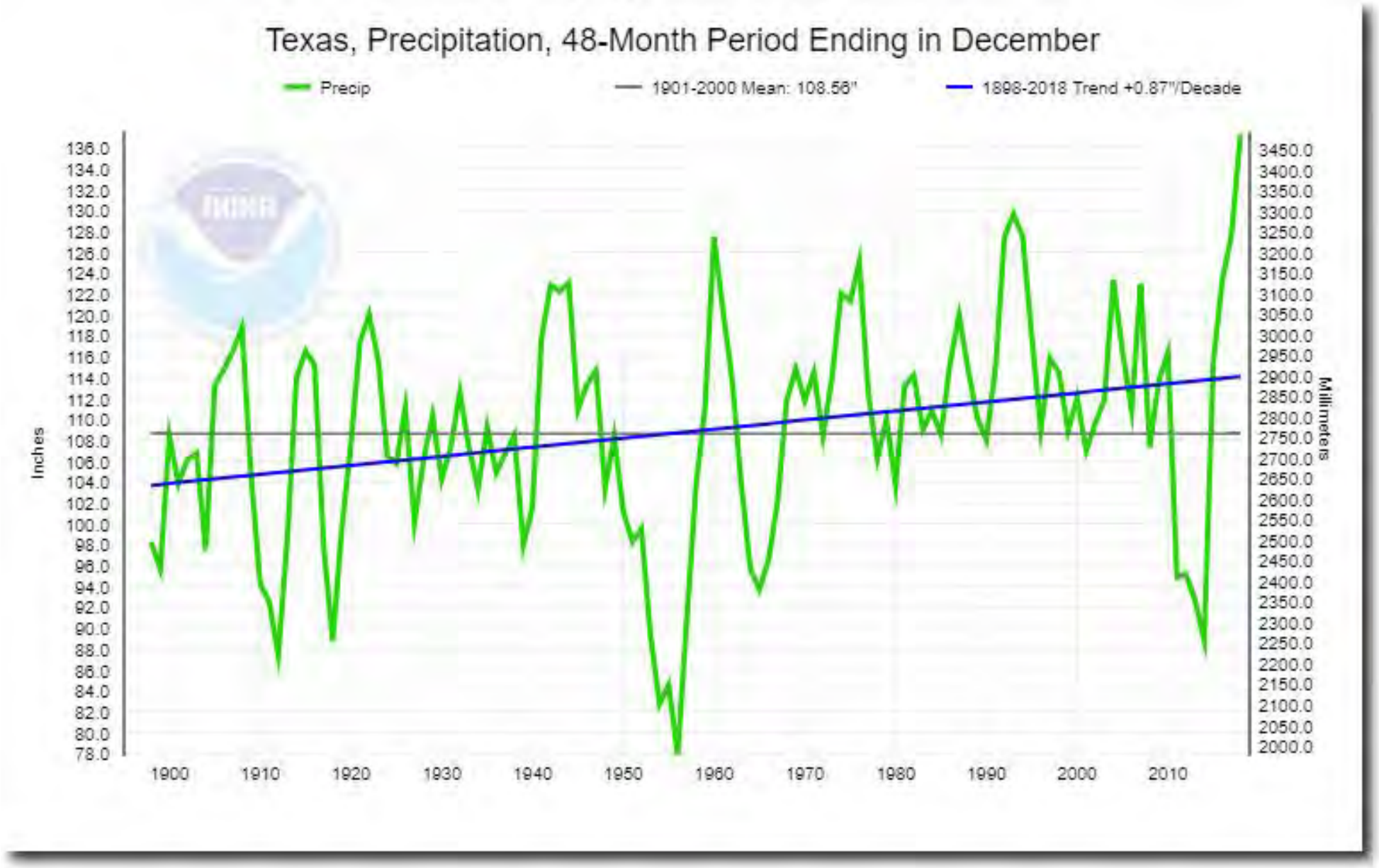
With No End in Sight for Texas Drought, ABC News Explains: "Every Farmer in the World Will Be Affected by Climate Change"

JOE ROMM AUG 16, 2011, 11:22 PM

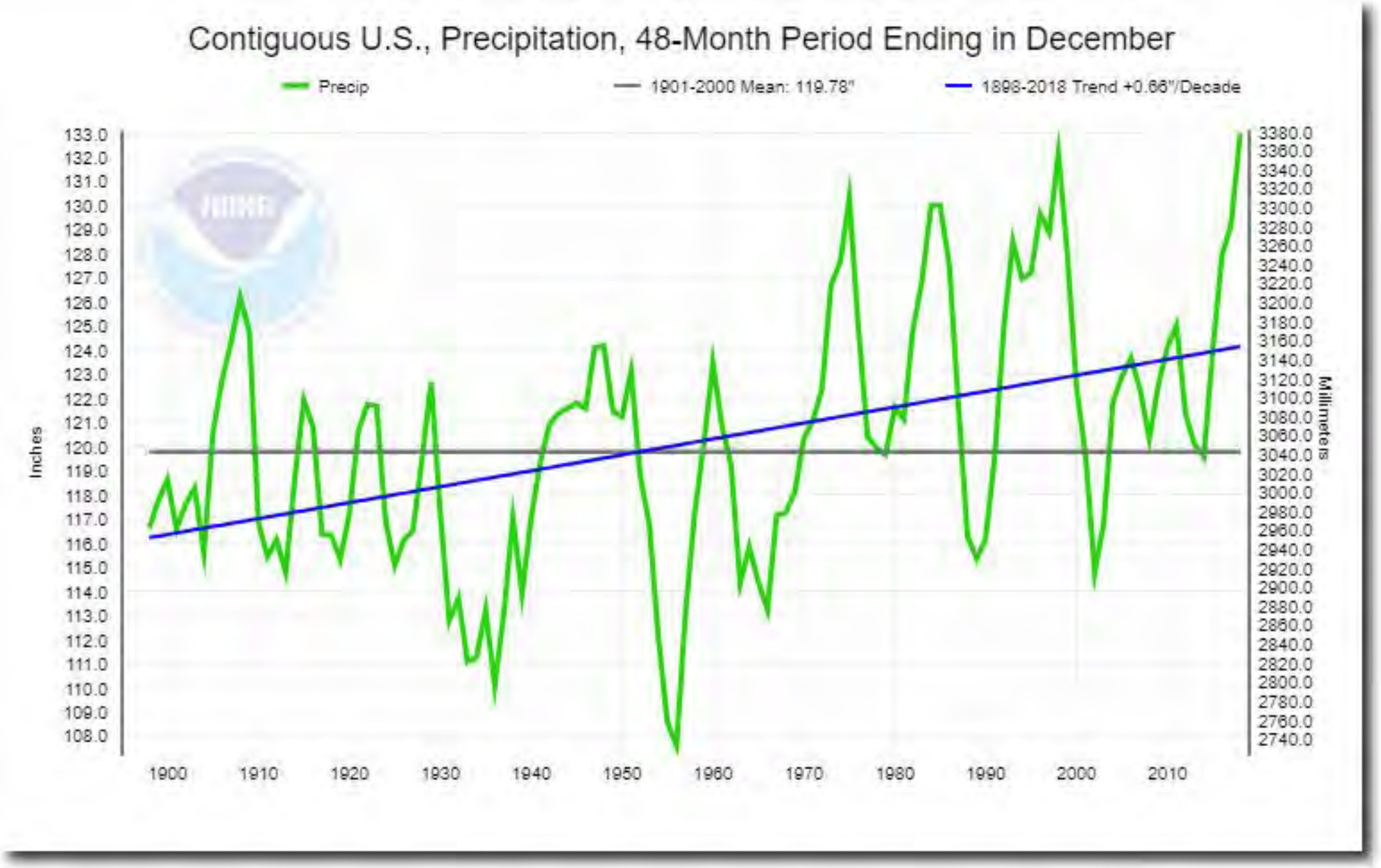
Texas Precipitation



Texas precipitation 48 month periods



US precipitation 48 month period



- In light of *all* of the above findings, it would appear that instead of making droughts worse, the global warming/climate change experienced over the past century appears to have *ameliorated* them. And *that* finding stands in stark opposition to model-based predictions of future drought, which foresee them getting more frequent and severe as the CO_2 concentration of the atmosphere rises.

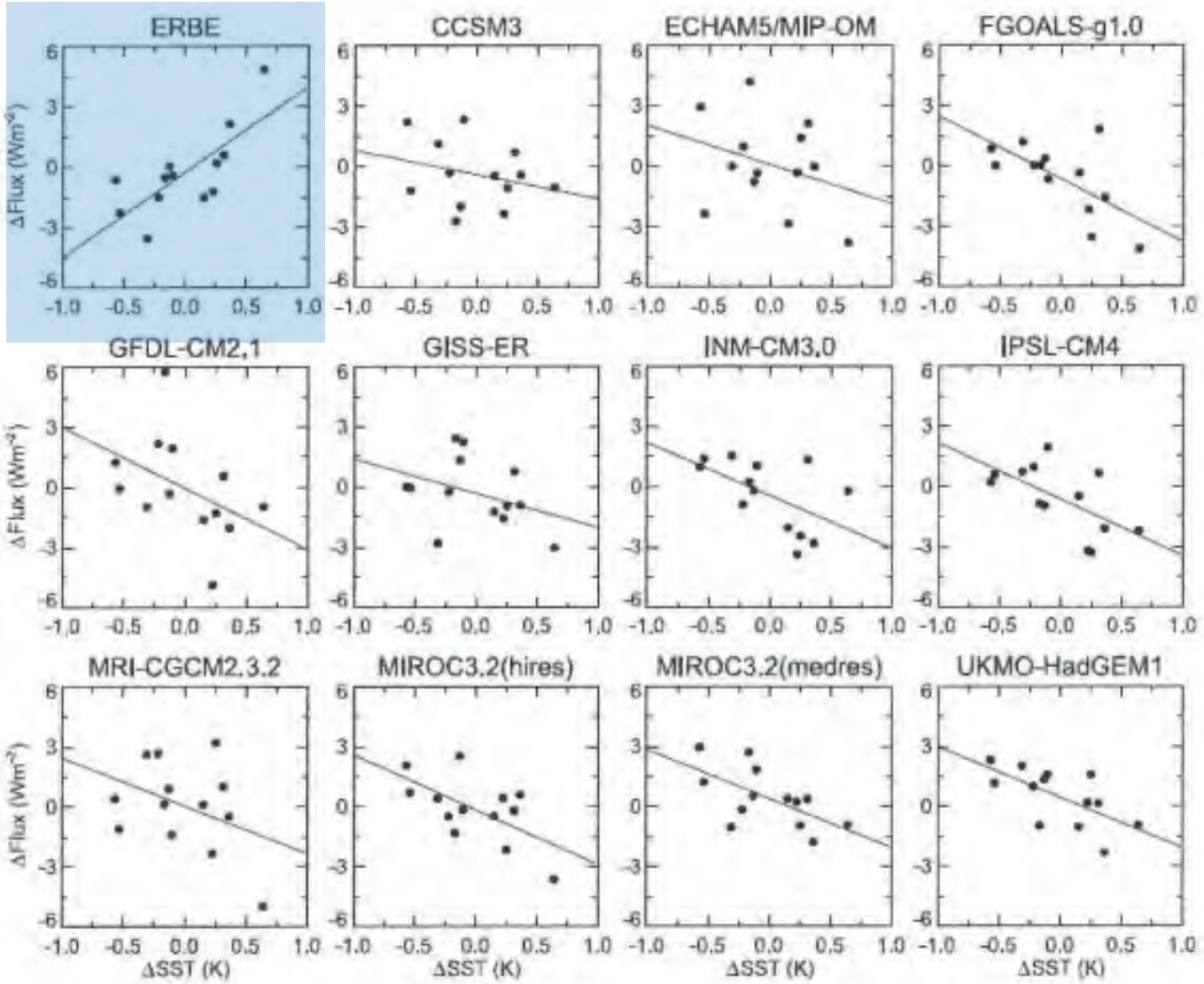


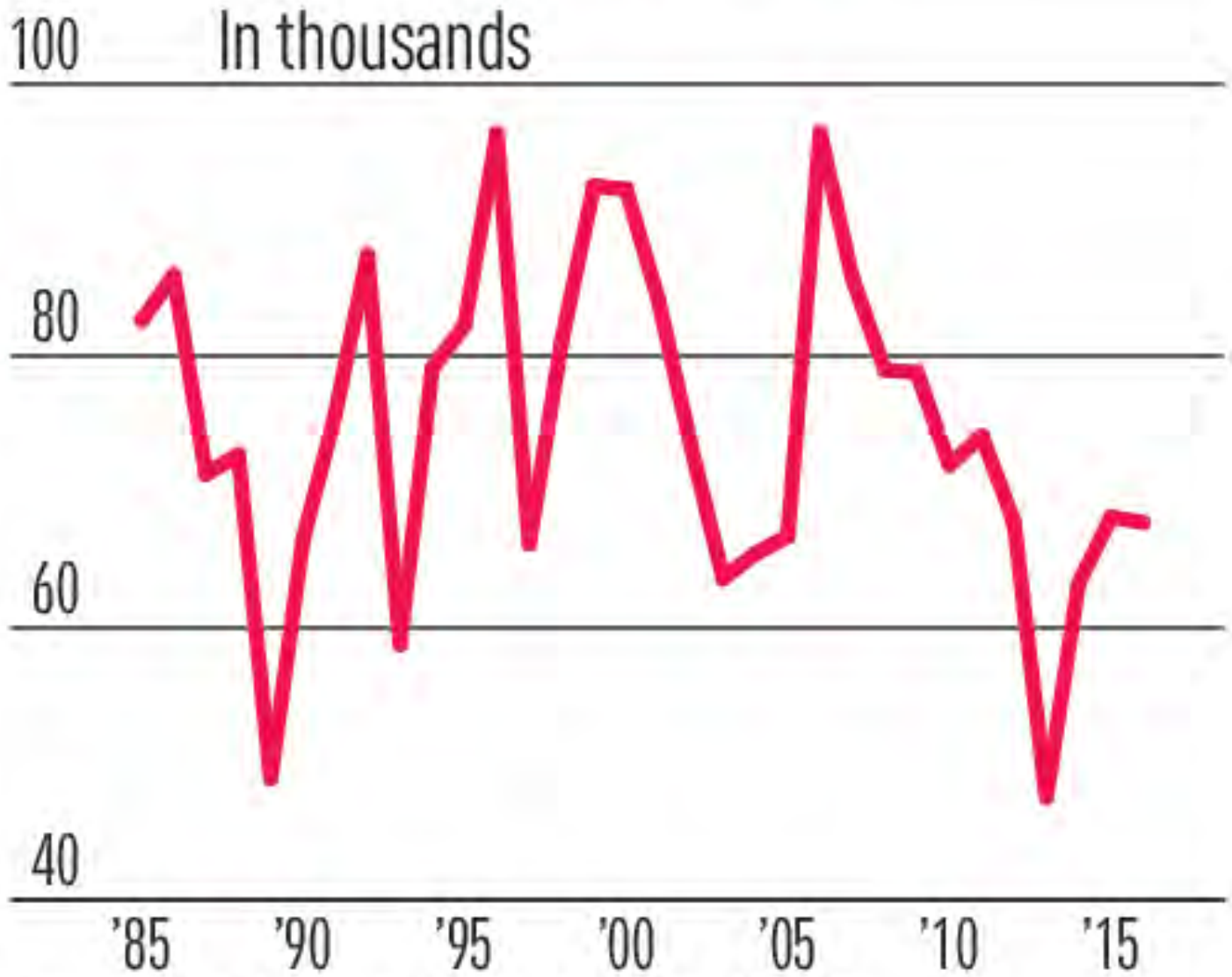
Figure 7: Outgoing radiation from earth (vertical axis) against sea surface temperature (horizontal), as measured by the ERBE satellites (upper left graph) and as "predicted" by 11 climate models (the other graphs).[17] Notice that the slope of the graphs for the climate models are opposite to the slope of the graph for the observed data.

Outgoing radiation vs Sea Surface Temp

Shaded box upper left ERBE satellite measurements

Other boxes – Climate models

Total Wildland Fires



Source: National Interagency Fire Center

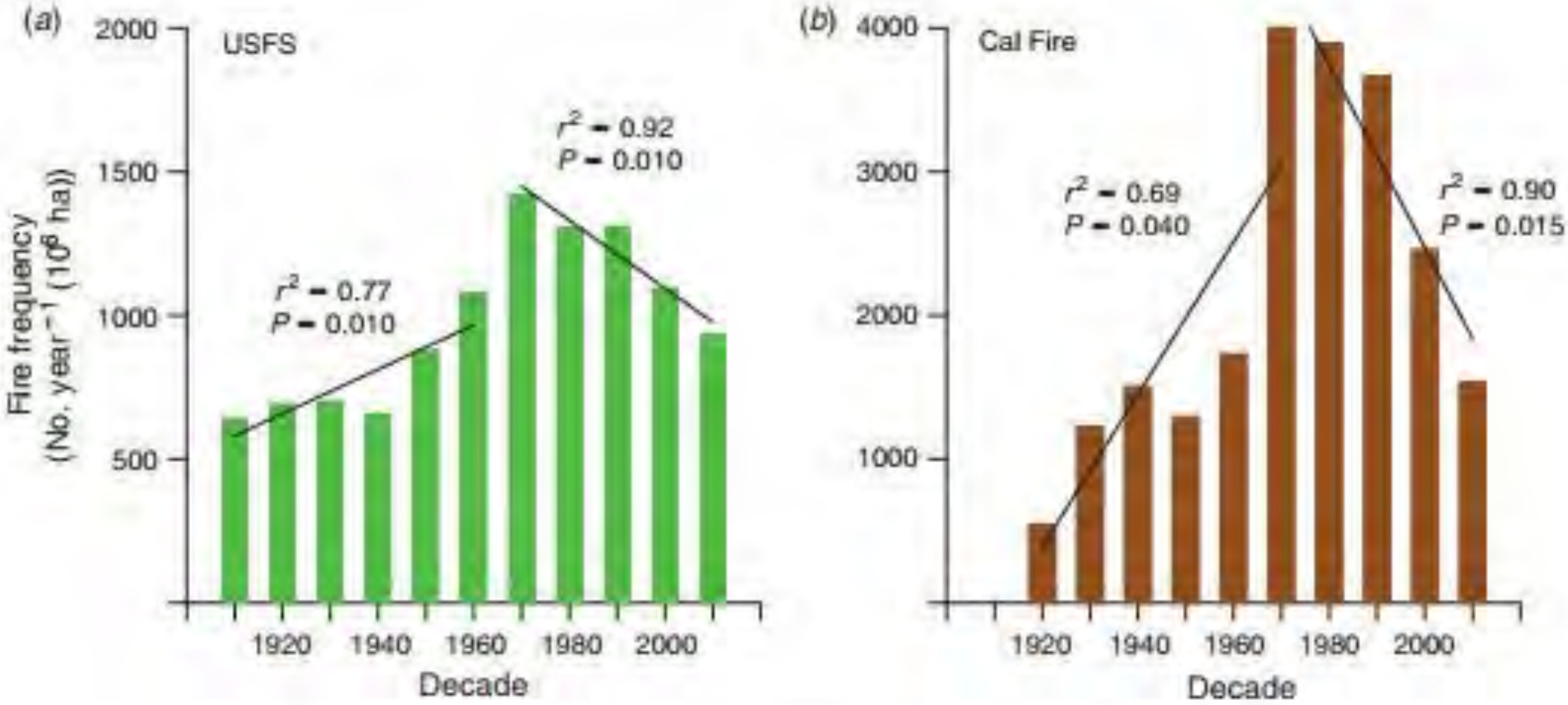
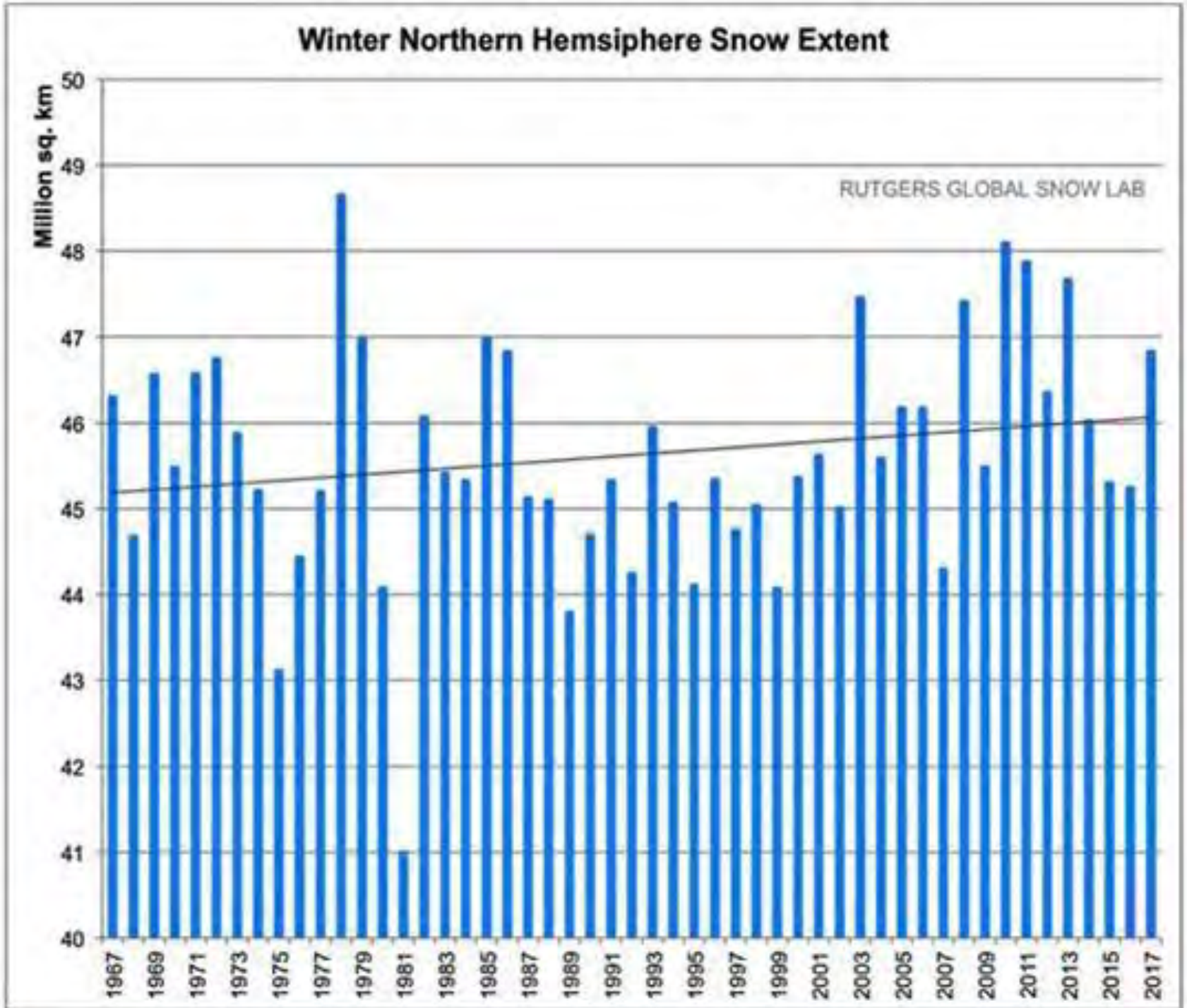


Fig. 4. Decadal patterns of ignitions on (*a*) USFS and (*b*) Cal Fire lands.

Snowfalls are now just a thing of the past

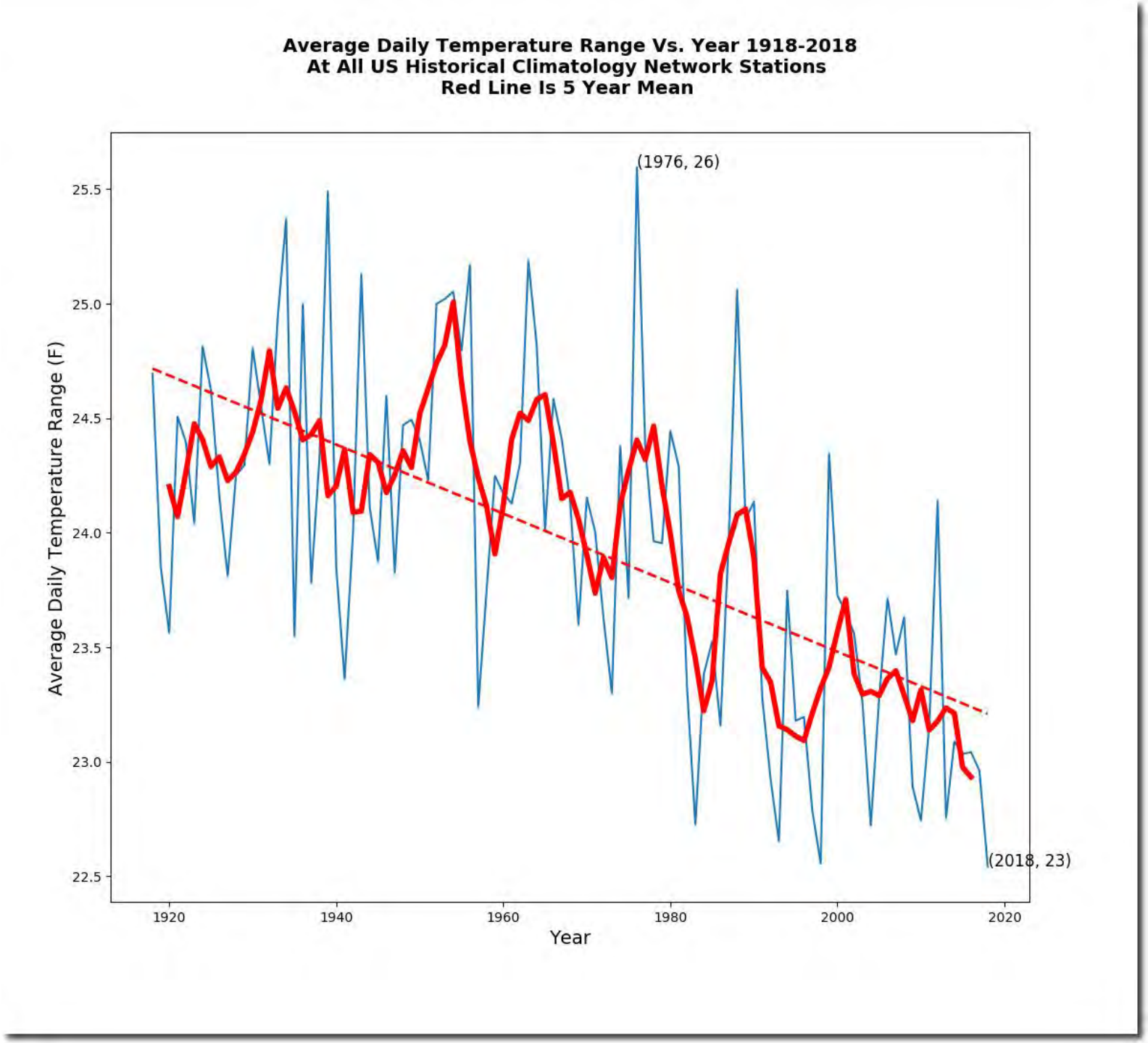
BY CHARLES ONIANS | Monday 20 March 2000

Britain's winter ends tomorrow with further indications of a striking environmental change: snow is starting to disappear from our lives.

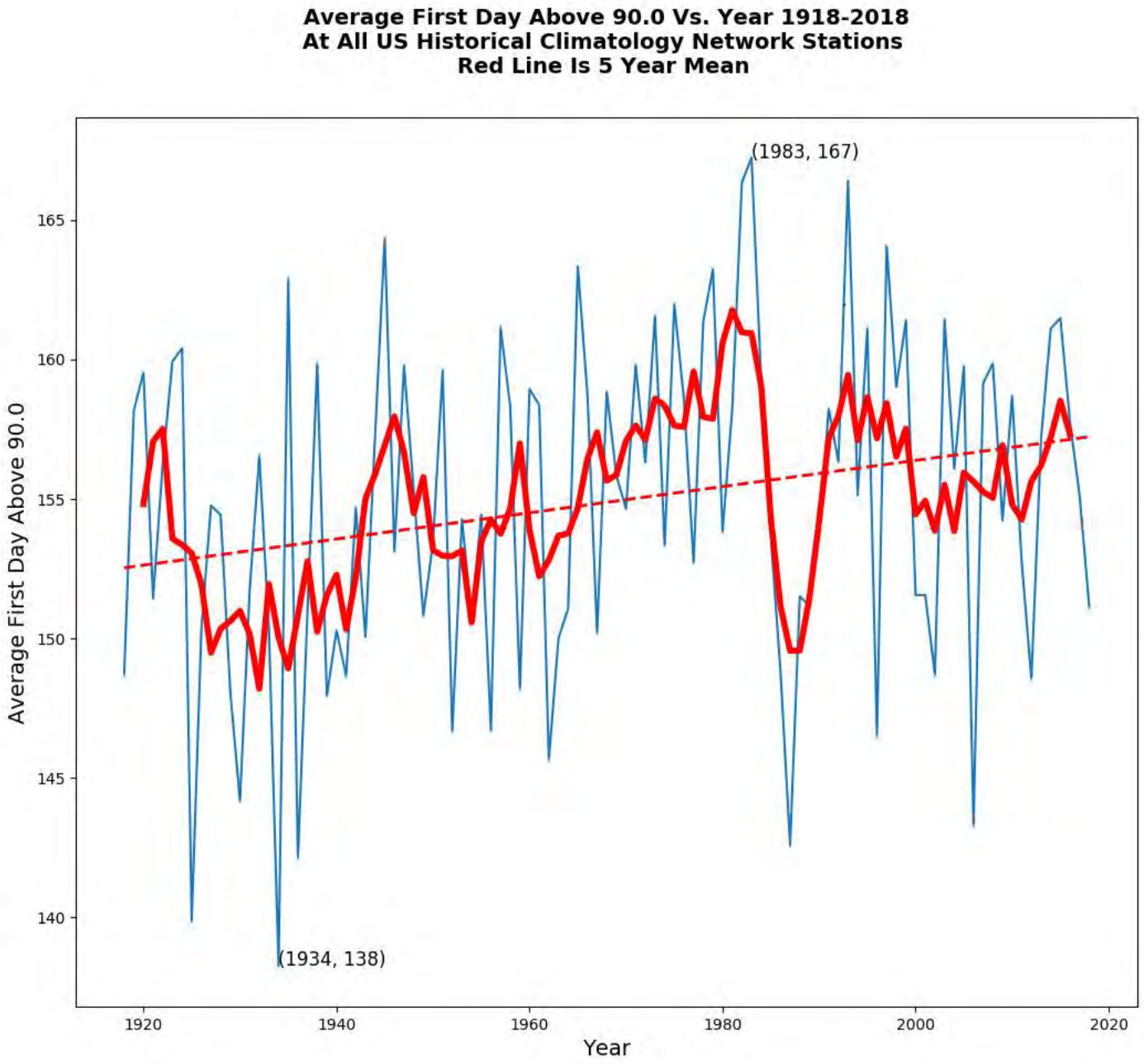

Winter Northern Hemsiphere Snow Extent
Million sq. km
RUTGERS GLOBAL SNOW LAB
50
49
48
47
46
45
44
43
42
41
40
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017

- **Weather is NOT getting more extreme**

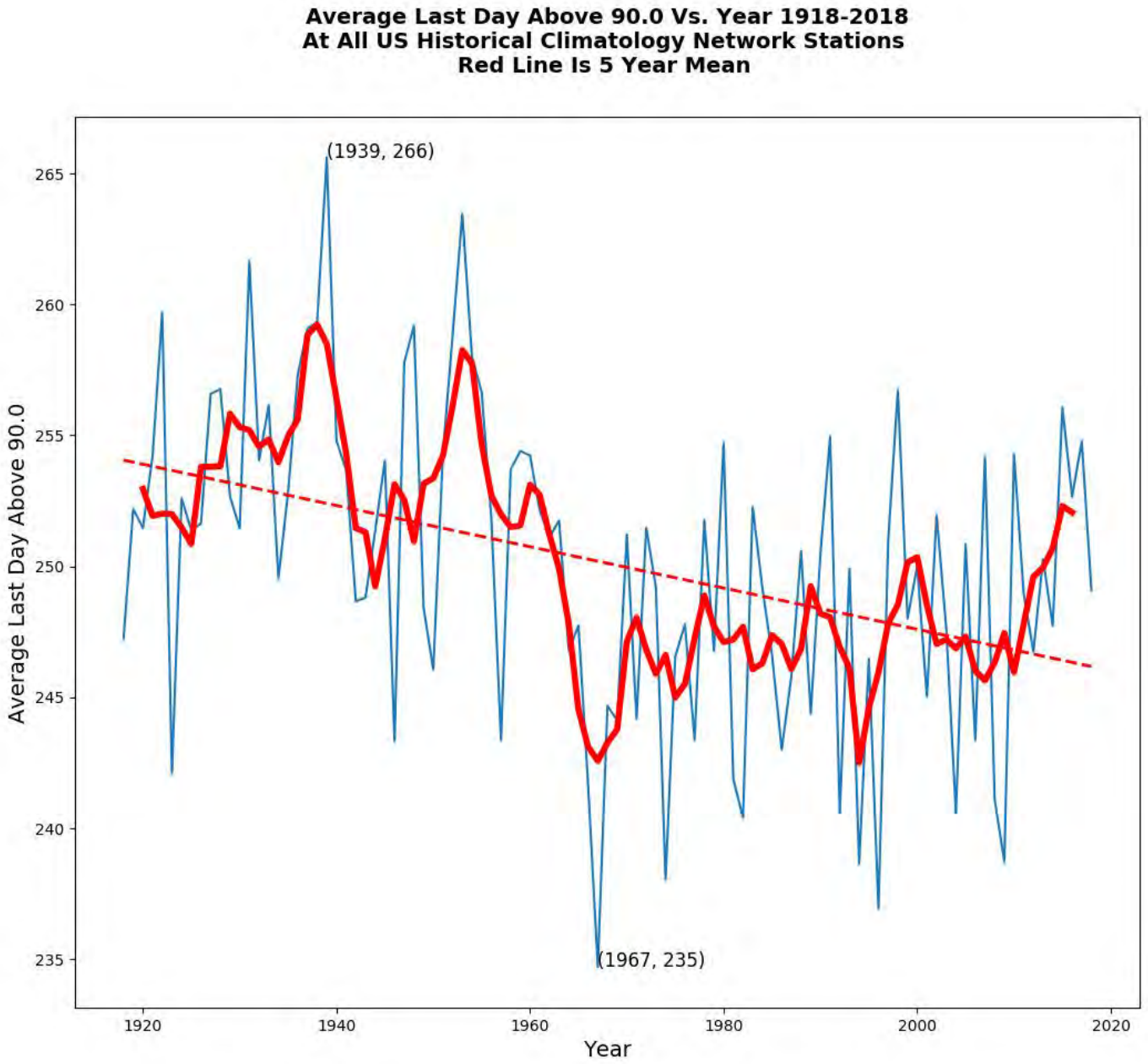
- Following charts are USHCN data, 1918 to 2018
- Blue lines are annual data
- Red lines are 5 yr averages



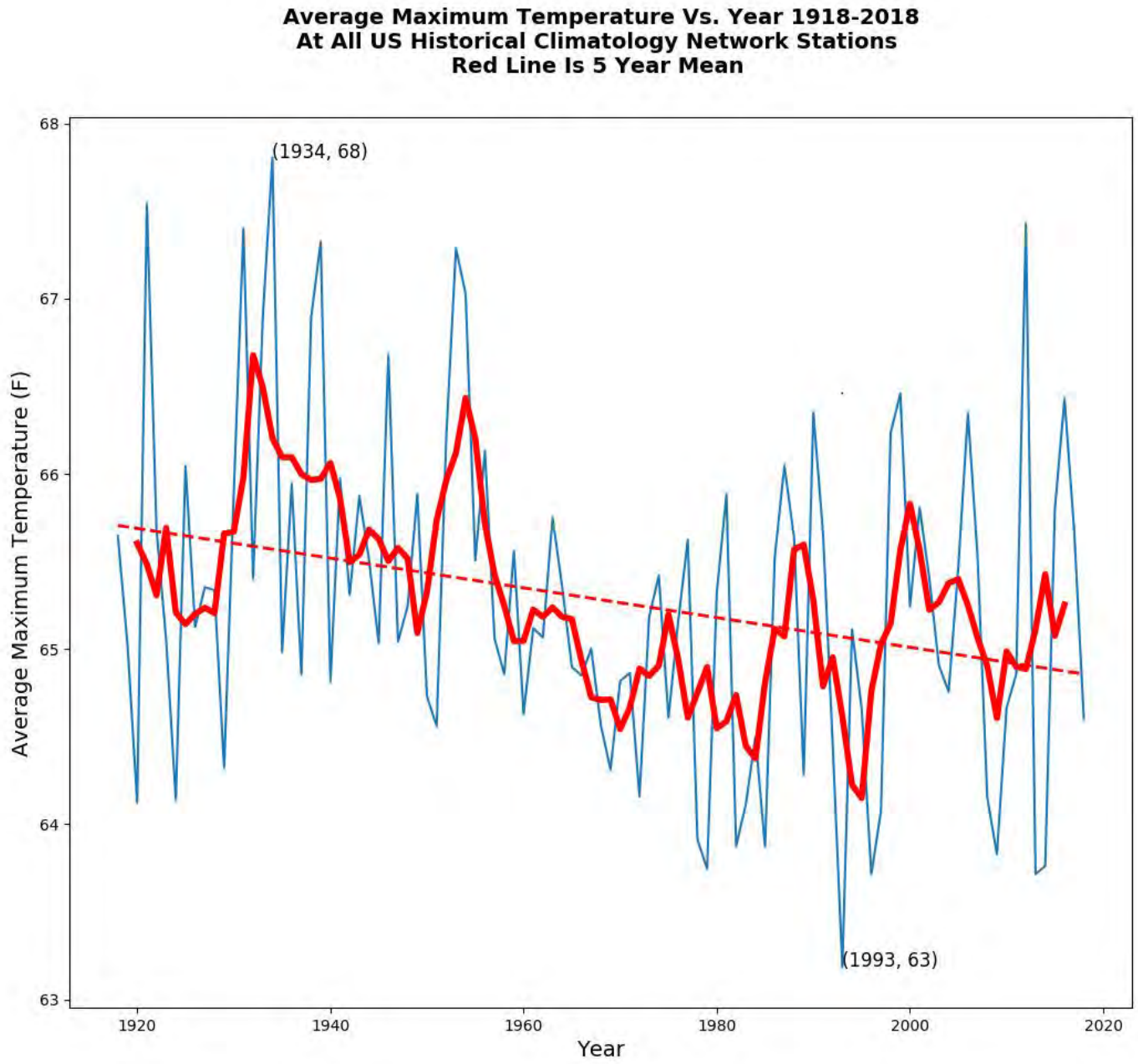
Average daily temperature range, all US Max to min getting smaller



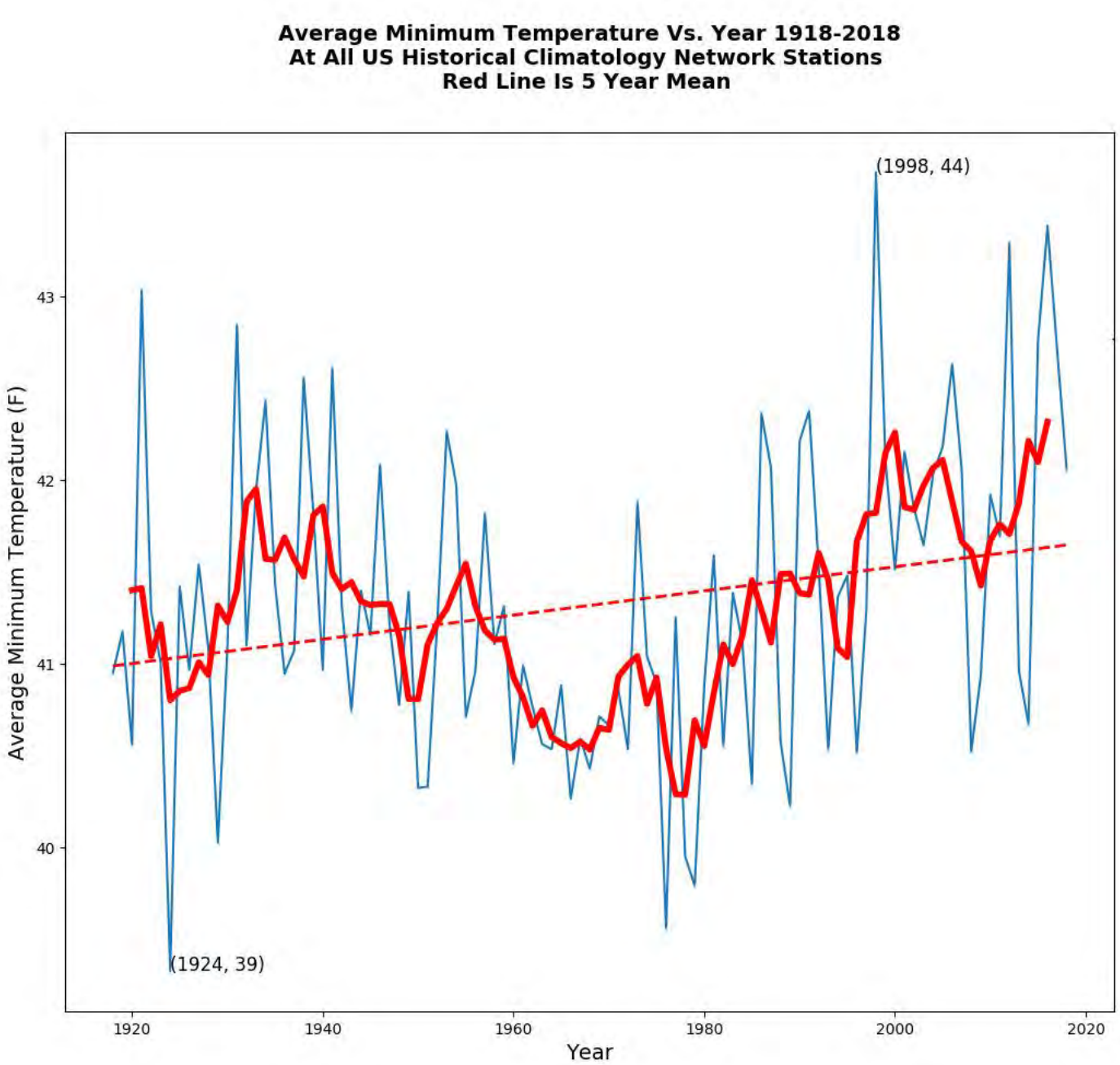
Average First day of the year above 90.0 all US becoming later



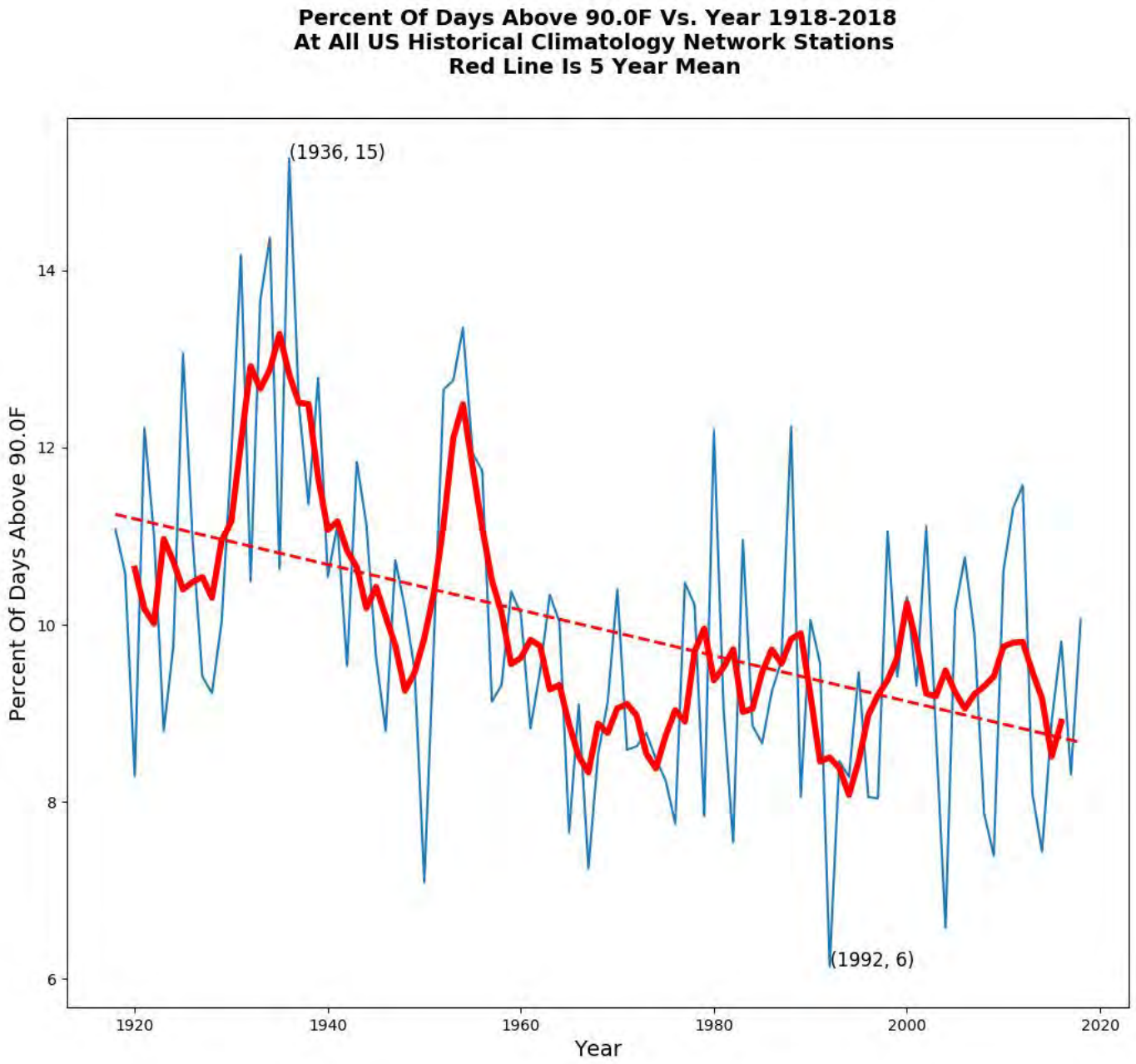
Average Last day of the year above 90.0 all US coming earlier



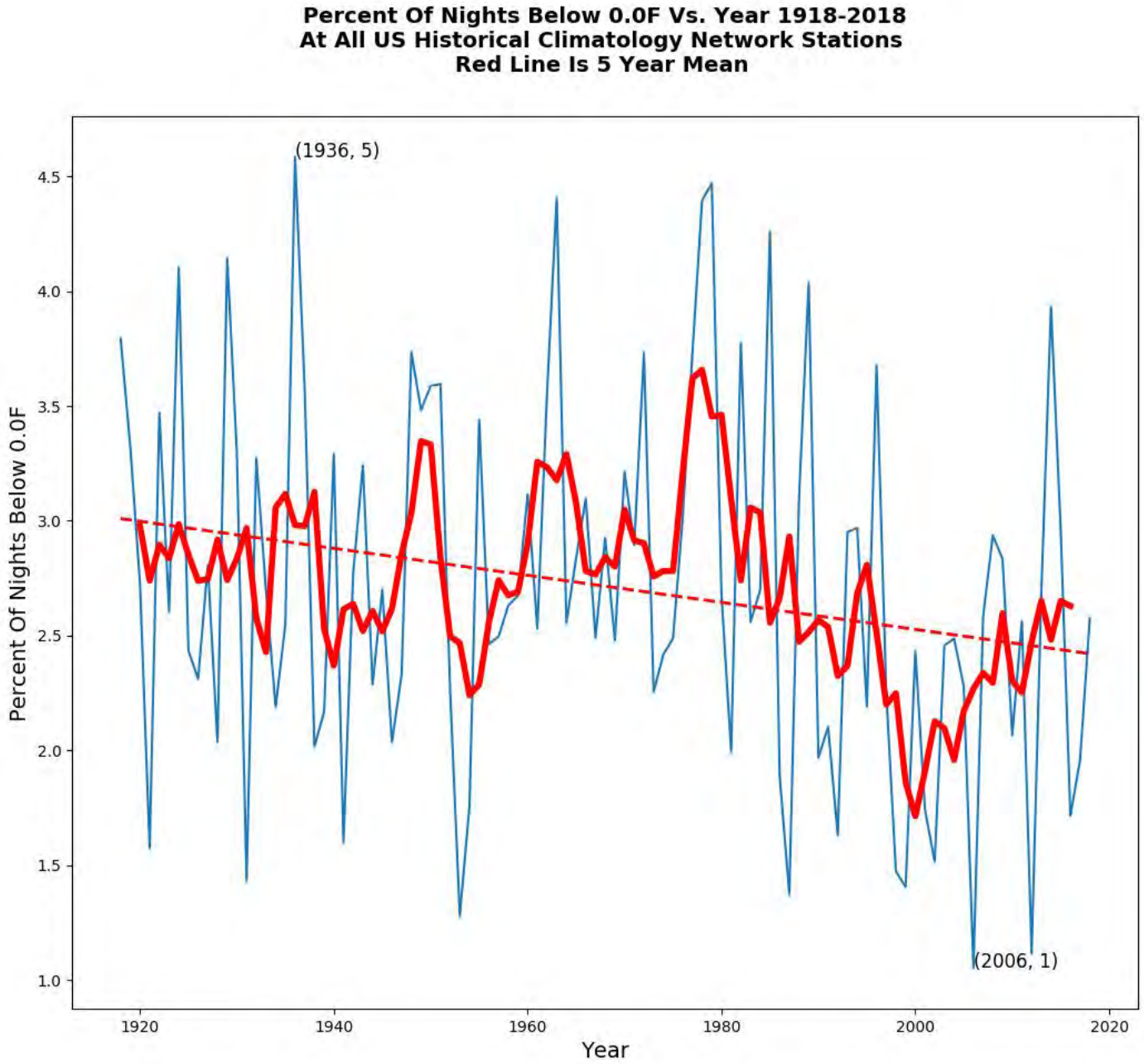
Average max temperature all US becoming lower



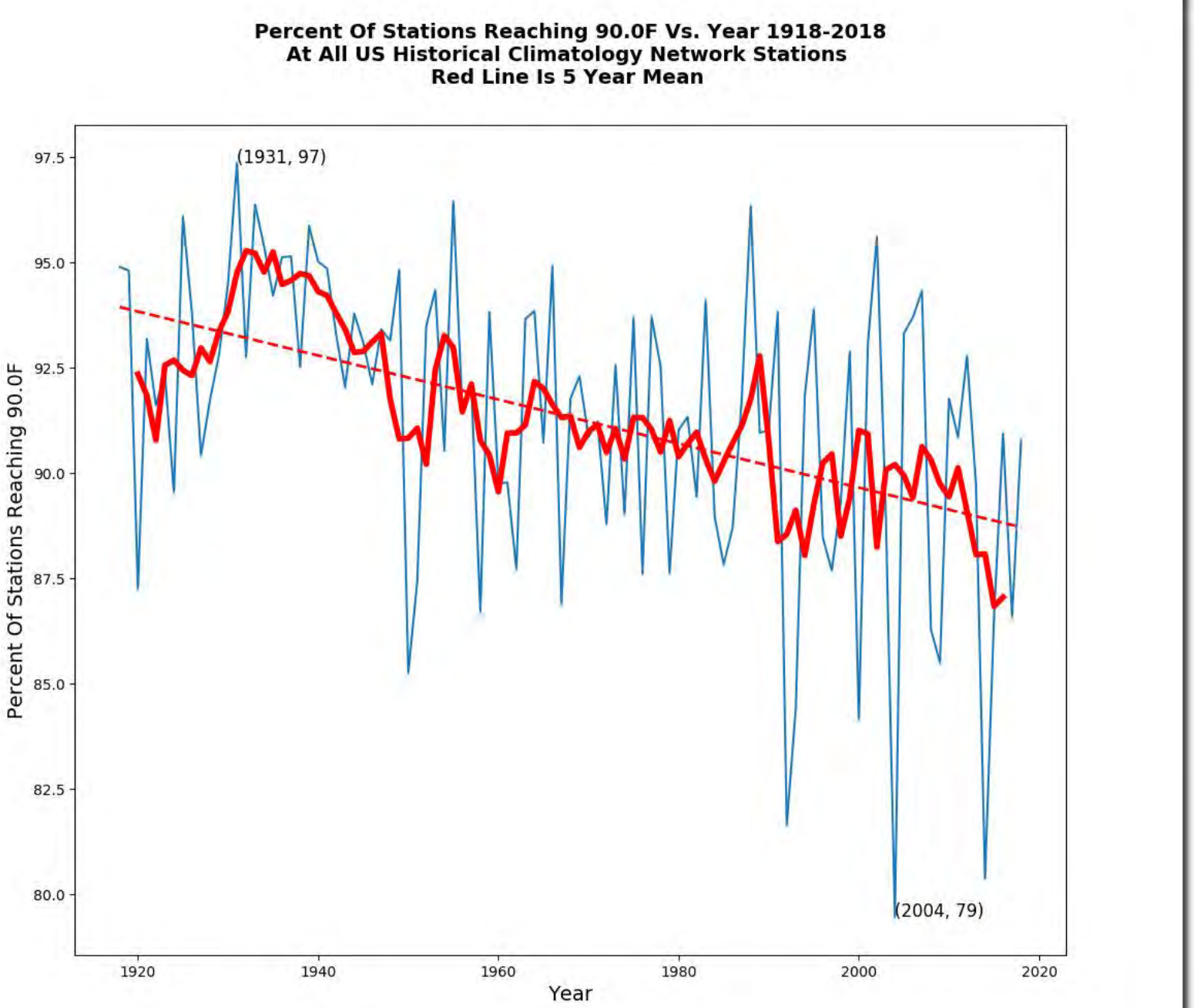
Average min temperature all US becoming higher



Percent of days above 90 all US getting smaller

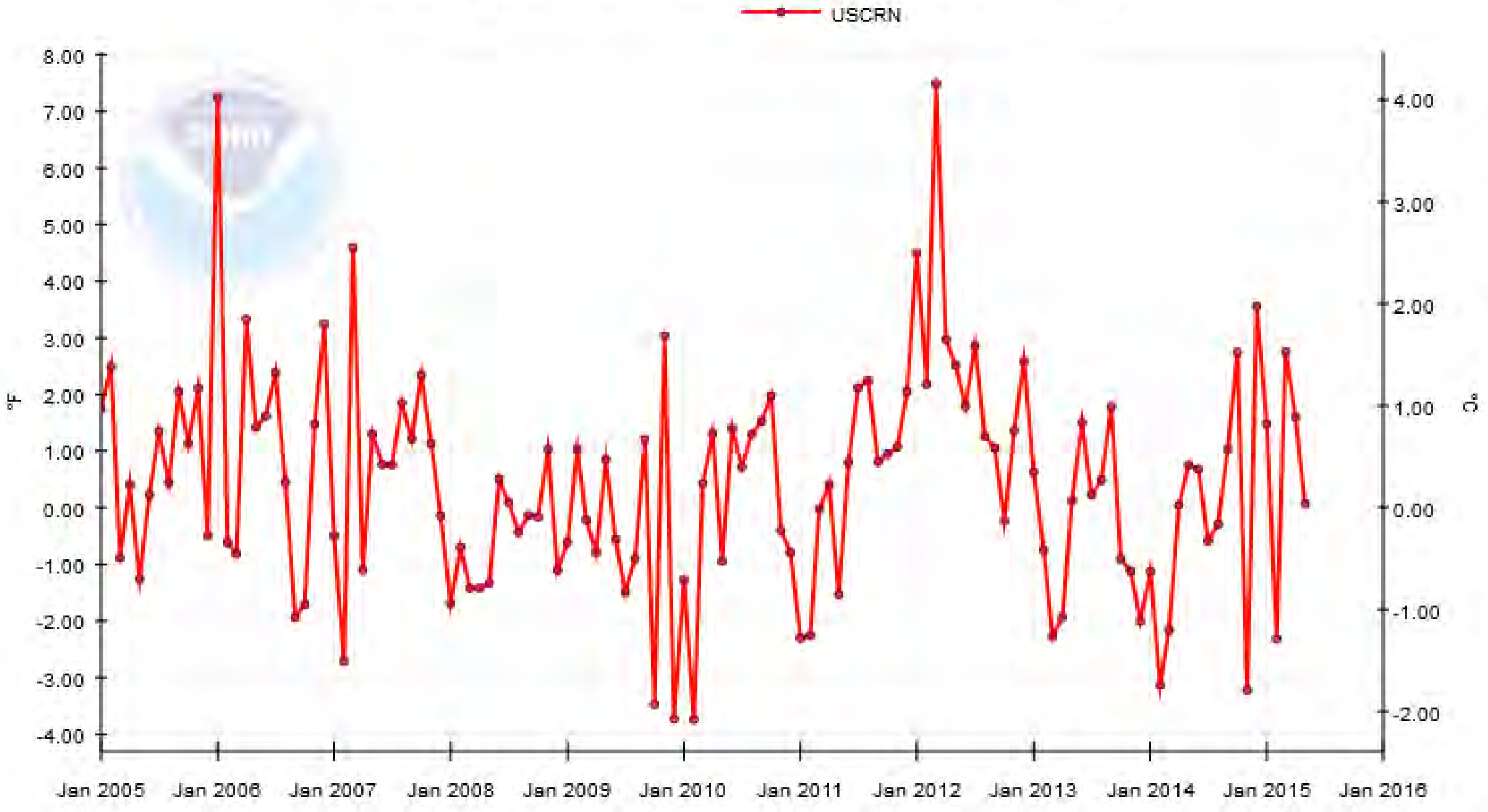


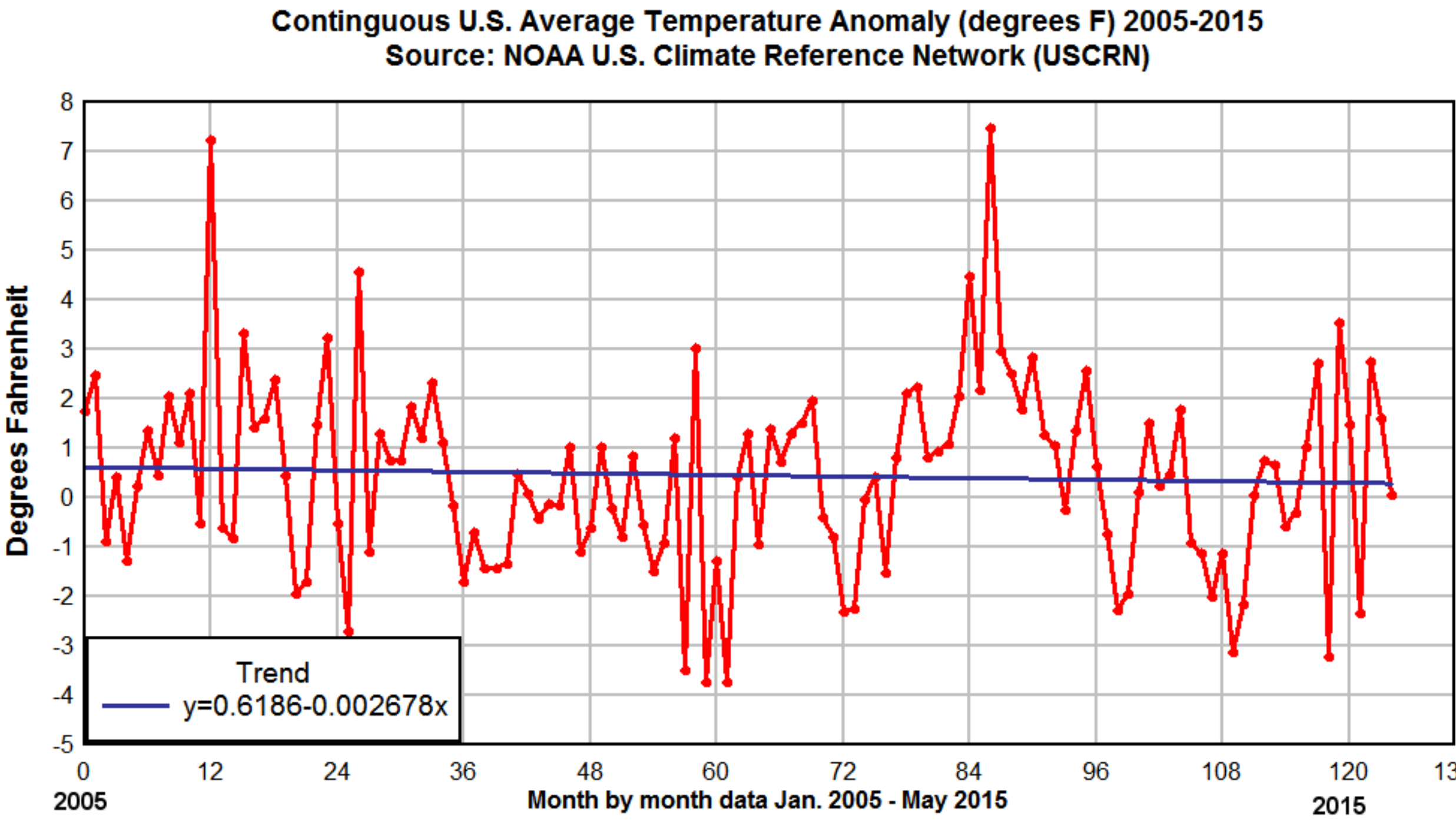
Percent of nights below 0 deg F all US getting smaller



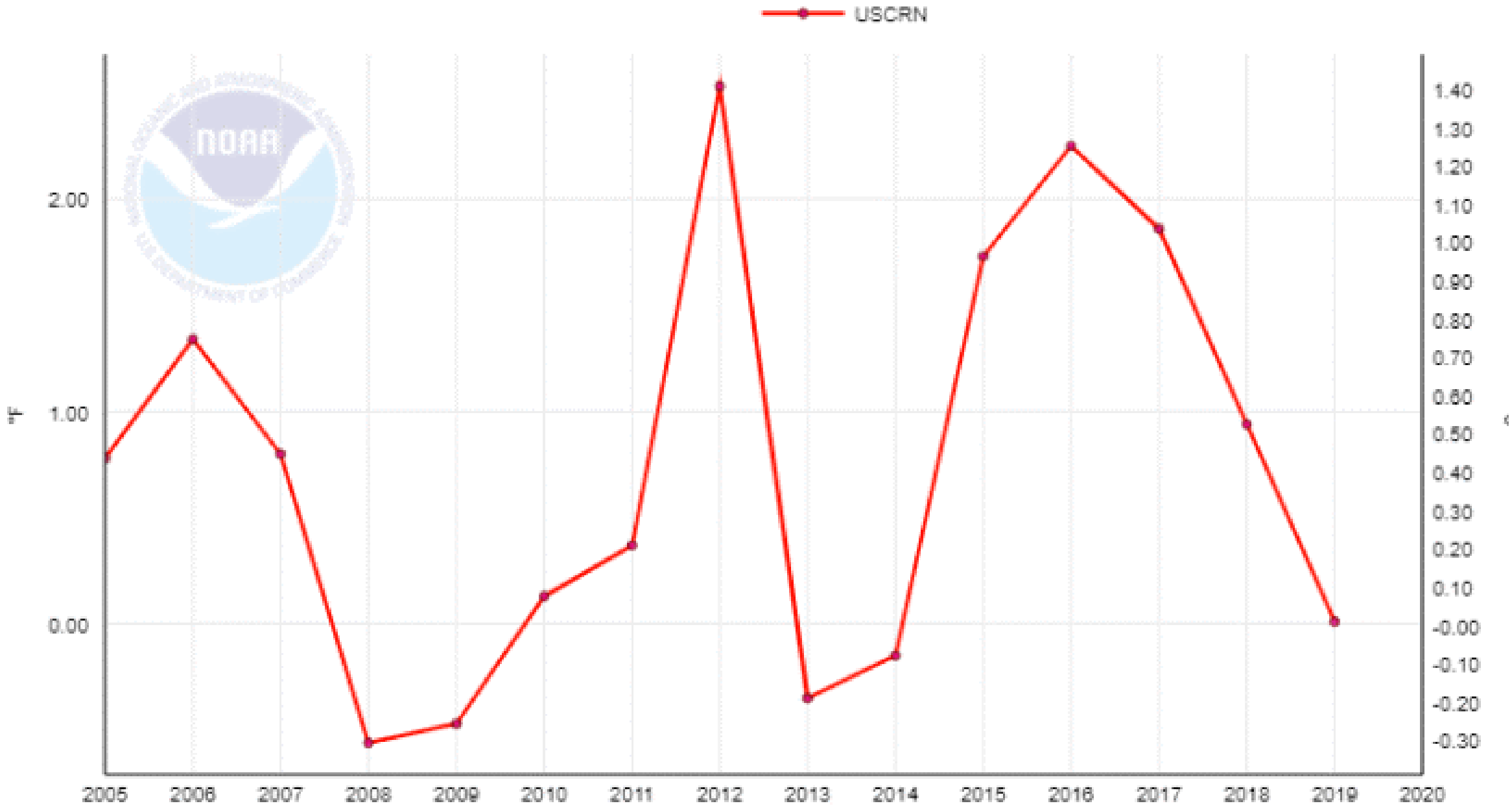
Percent of Stations reaching 90 deg F all US becoming smaller

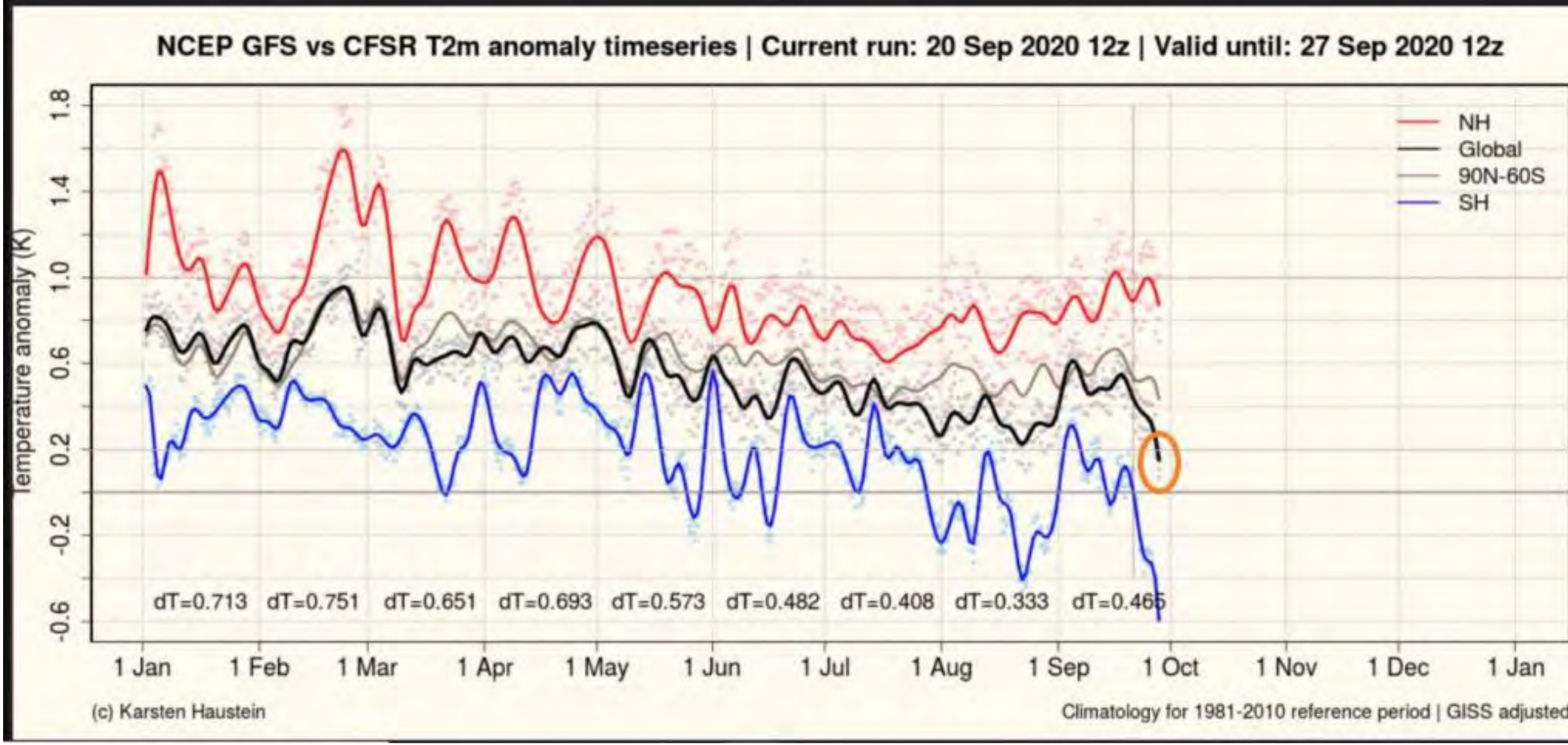
Continguous U.S. Average Temperature Anomaly




Continguous U.S. Average Temperature Anomaly (degrees F) 2005-2015
Source: NOAA U.S. Climate Reference Network (USCRN)
Degrees Fahrenheit
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
Trend
y=0.6186-0.002678x
0
12
24
36
48
60
72
84
96
108
120
130
2005
Month by month data Jan. 2005 - May 2015
2015

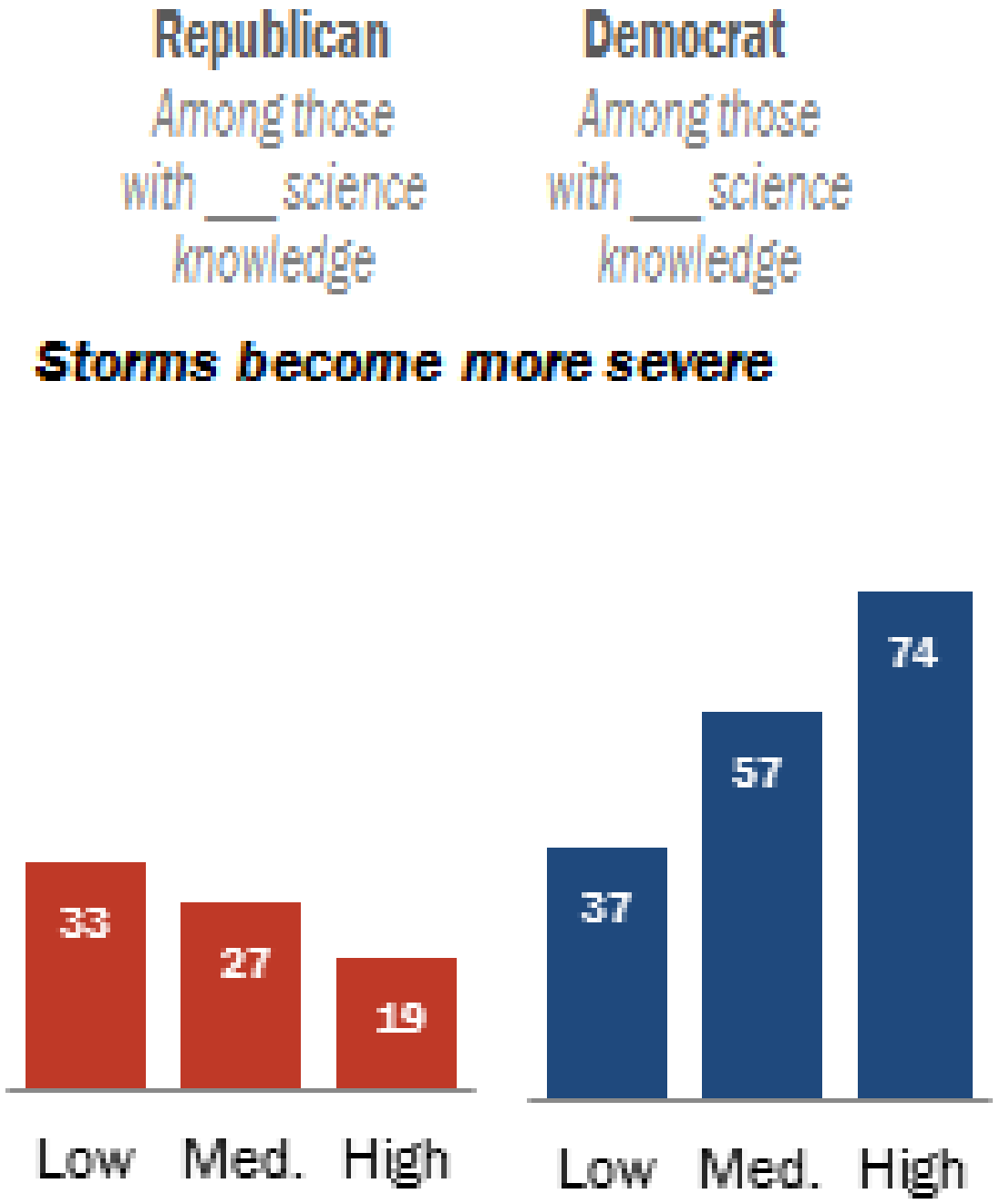
Contiguous U.S. January - December Average Temperature Anomaly





http://www.karstenhaustein.com/climate.php

Pew Research Center Oct 2016



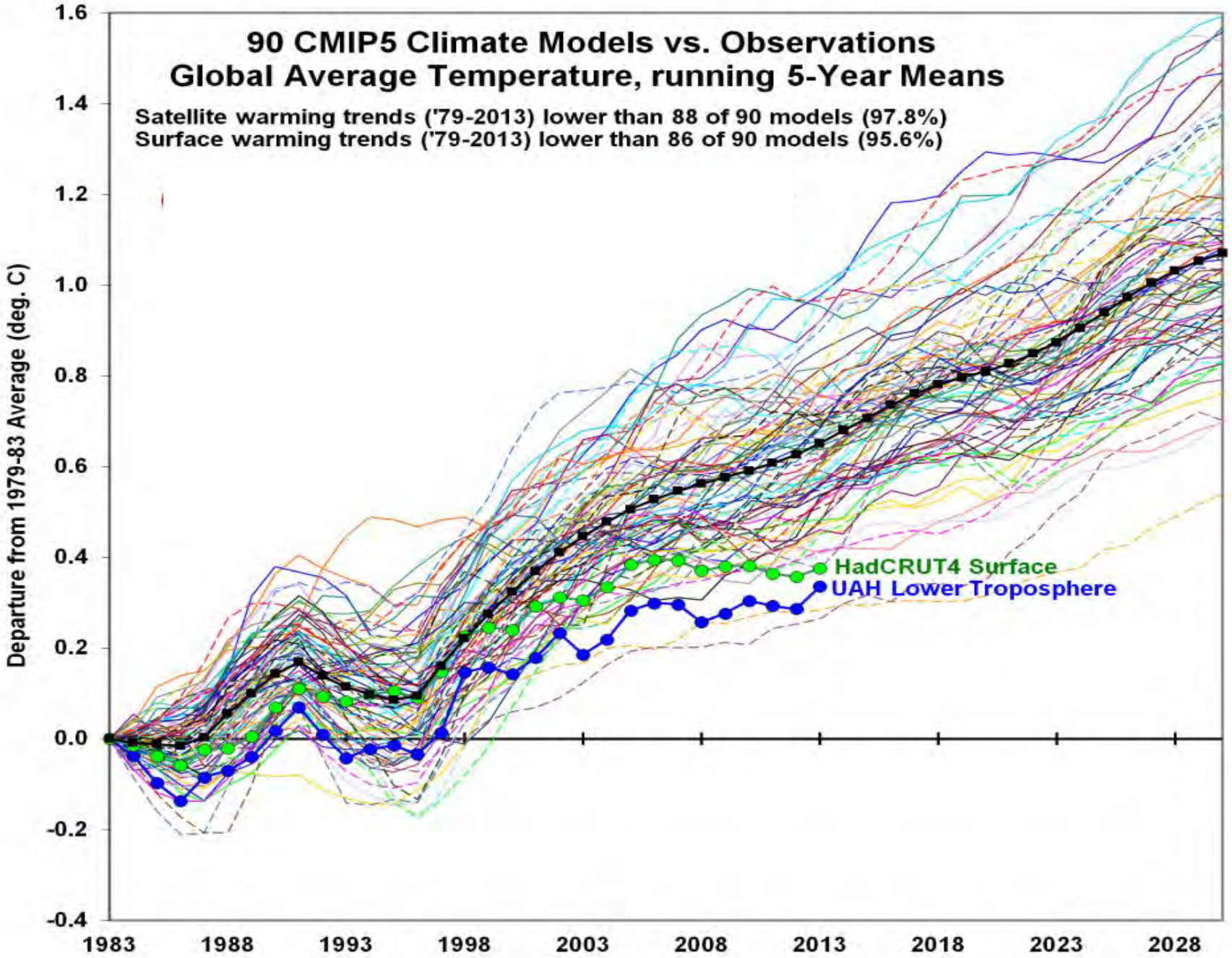
Model Issues

As climate modeller Syukuro Manabe has said: “The climate model is a very good tool for understanding climate, but a very bad tool for predicting climate”.

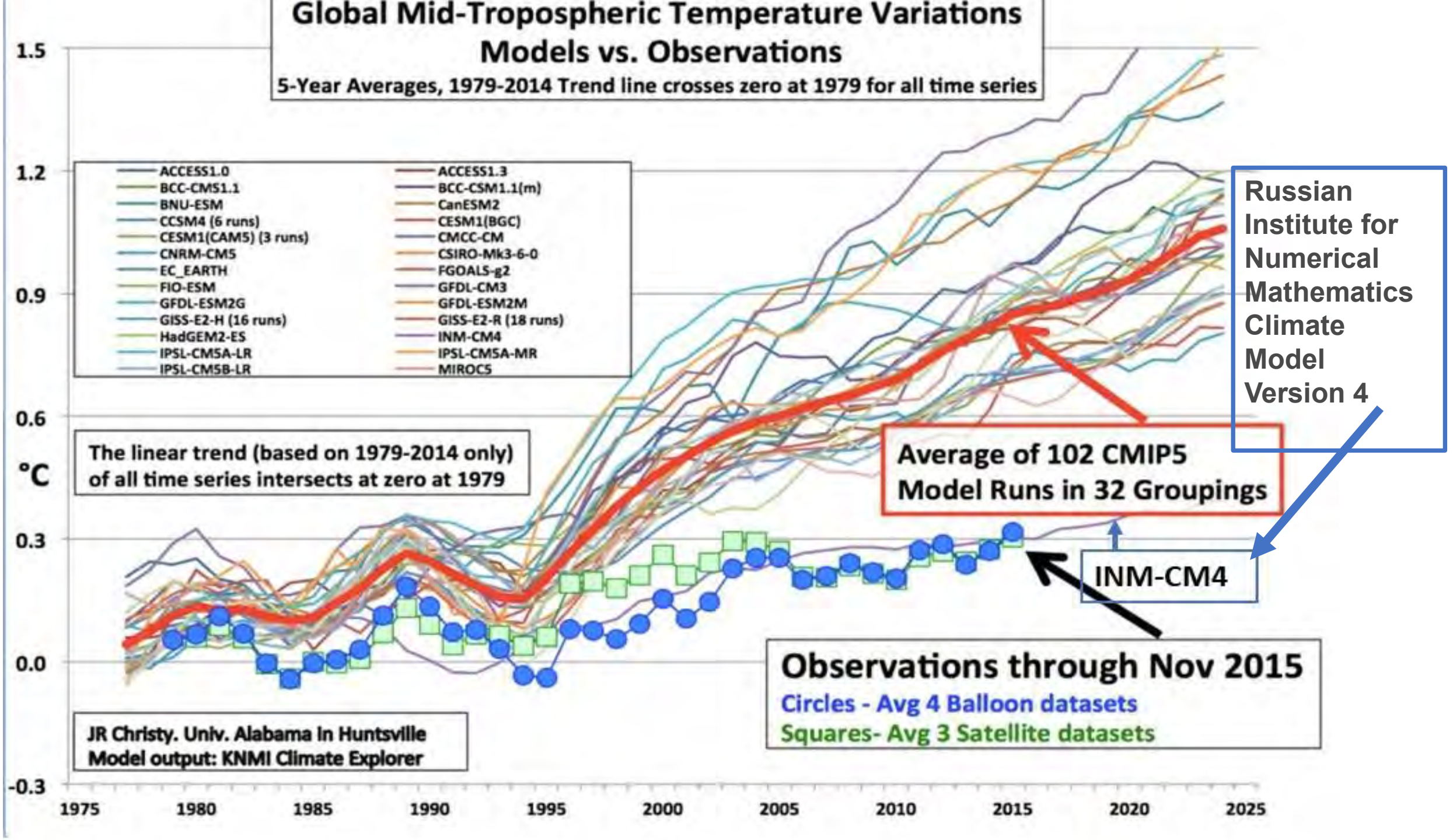
- *"People underestimate the power of models. Observational evidence is not very useful"* – attributed to John Mitchell, UK MET (probably out of context)

- Most fields of science don't accept a model unless it has been rigorously validated against available data, but climate science is different; the modelling process itself frequently seems to be accepted as evidence that the climate model is correct, a circular chain of reasoning which leads to positions which outside of climate science would be considered absurd.

- **[C]limatologists tell the models there will be strong CO_2-driven warming; sure enough, the models tell the climatologists the same; and the climatologists cite the outputs of the models as purported justification for the article of faith that they had built into the models in the first place.**



These are not random processes, but deterministic models. Why are they so different if "the science is settled"?


Global Mid-Tropospheric Temperature Variations
Models vs. Observations
5-Year Averages, 1979-2014 Trend line crosses zero at 1979 for all time series
ACCESS1.0
ACCESS1.3
BCC-CMS1.1
BCC-CSM1.1(m)
BNU-ESM
CanESM2
CCSM4 (6 runs)
CESM1(BGC)
CESM1(CAM5) (3 runs)
CMCC-CM
CNRM-CM5
CSIRO-Mk3-6-0
EC_EARTH
FGOALS-g2
FIO-ESM
GFDL-CM3
GFDL-ESM2G
GFDL-ESM2M
GISS-E2-H (16 runs)
GISS-E2-R (18 runs)
HadGEM2-ES
INM-CM4
IPSL-CM5A-LR
IPSL-CM5A-MR
IPSL-CM5B-LR
MIROC5
Russian Institute for Numerical Mathematics Climate Model Version 4
The linear trend (based on 1979-2014 only) of all time series intersects at zero at 1979
Average of 102 CMIP5 Model Runs in 32 Groupings
INM-CM4
Observations through Nov 2015
Circles - Avg 4 Balloon datasets
Squares- Avg 3 Satellite datasets
JR Christy. Univ. Alabama in Huntsville
Model output: KNMI Climate Explorer
°C
1.5
1.2
0.9
0.6
0.3
0.0
-0.3
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025


Watch later
Share
If you thought that science was certain – well, that is just an error on your part.
Richard Feynman - Noble Laureate in Physics

IPCC's Statement

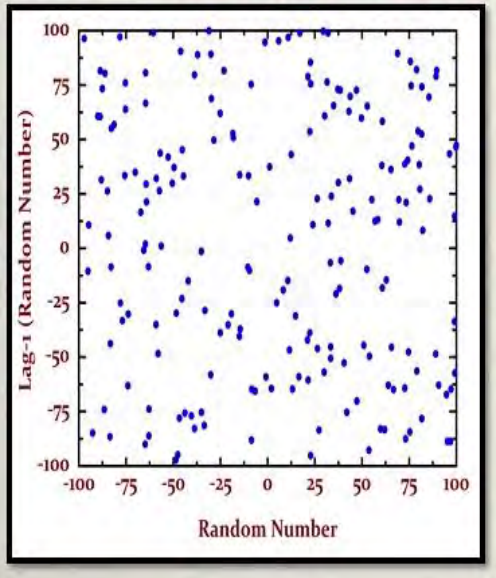
- As the IPCC itself said (AR4 WG1): "*we should recognise that we are dealing with a coupled nonlinear chaotic system, and therefore that the long-term prediction of future climate states is not possible.*"

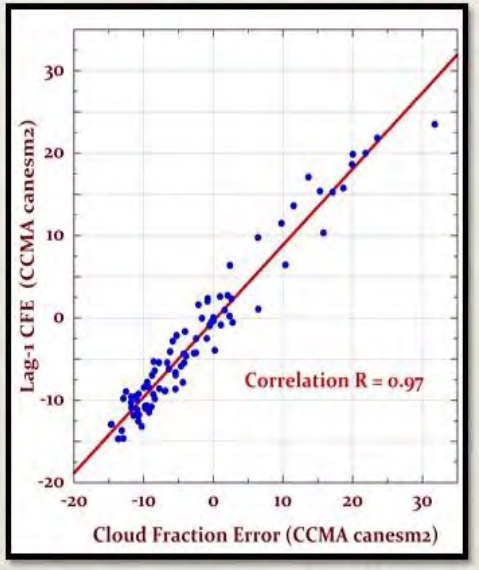
Propagation of Error and the Reliability of Global Air Temperature Projections

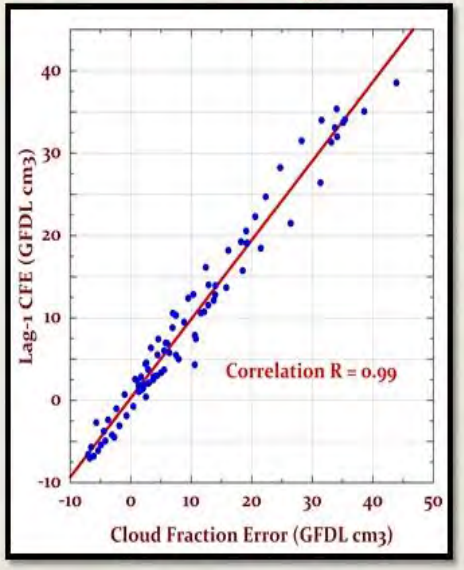
Front. Earth Sci., 06 September 2019

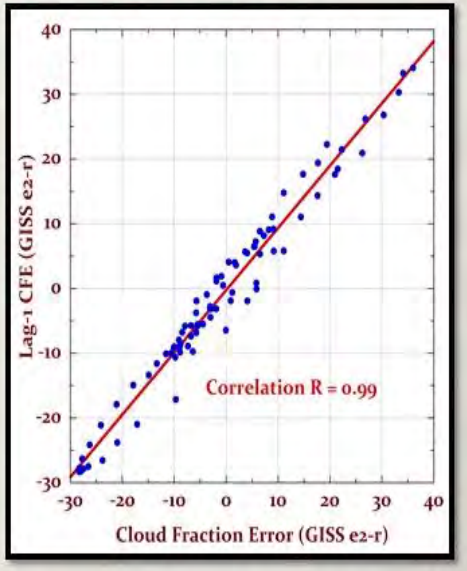
- A directly relevant GCM calibration metric is the annual average ±12.1% error in global annual average cloud fraction produced within CMIP5 climate models. This error is strongly pair-wise correlated across models, implying a source in deficient theory. The resulting long-wave cloud forcing (LWCF) error introduces an annual average ±4 Wm^{-2} uncertainty into the simulated tropospheric thermal energy flux.
- This annual ±4 Wm^{-2} simulation uncertainty is **±114 × larger** than the annual average ~0.035 Wm^{-2} change in tropospheric thermal energy flux produced by increasing GHG forcing since 1979
- Patrick Frank, SLAC National Accelerator Laboratory, Stanford University, Menlo Park, CA, United States

Cloud-Fraction Error: Intra-Model Lag-1 Correlations

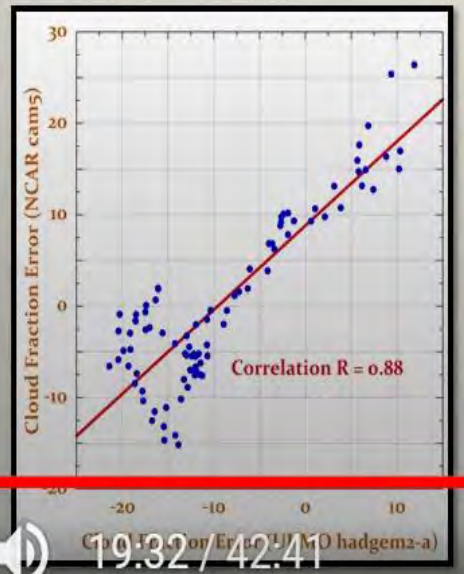


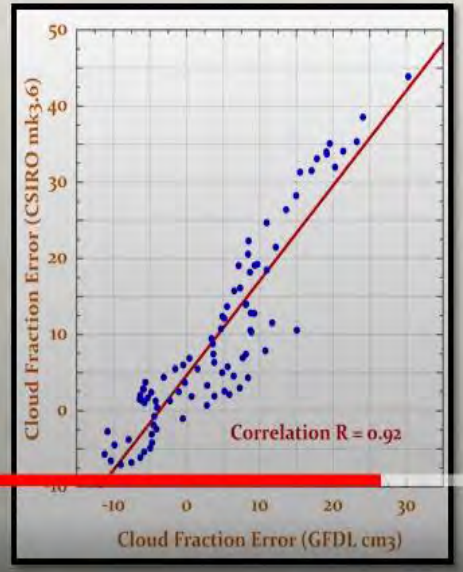


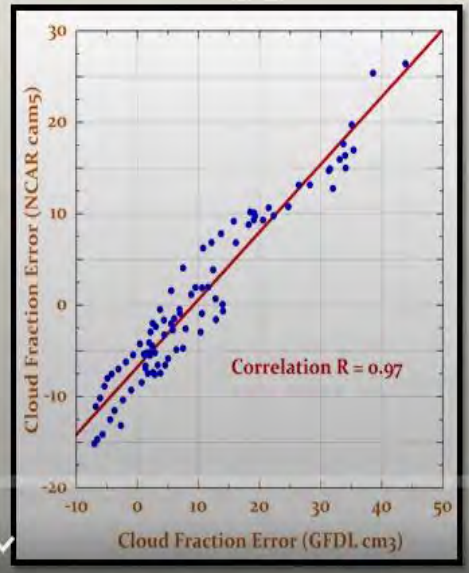


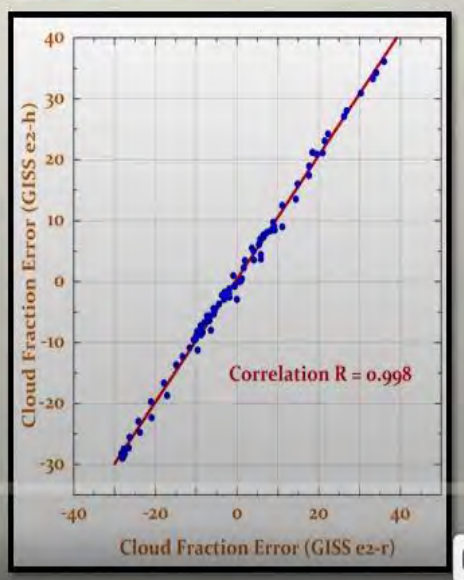


Cloud-Fraction Error: Inter-Model Correlations





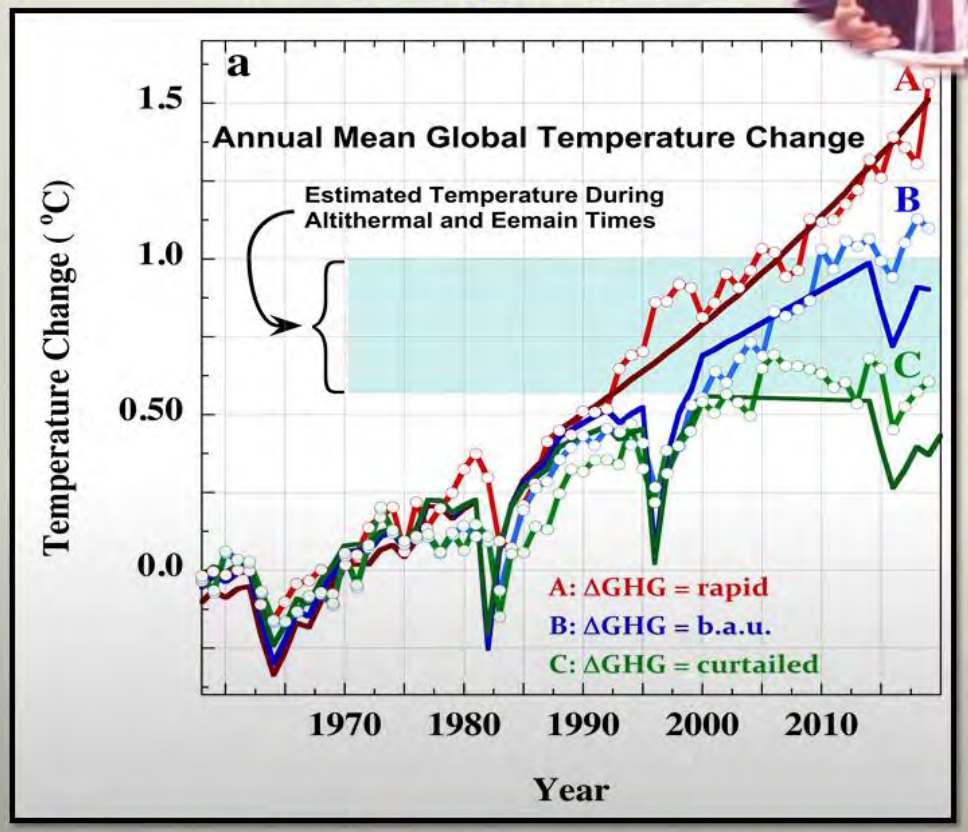




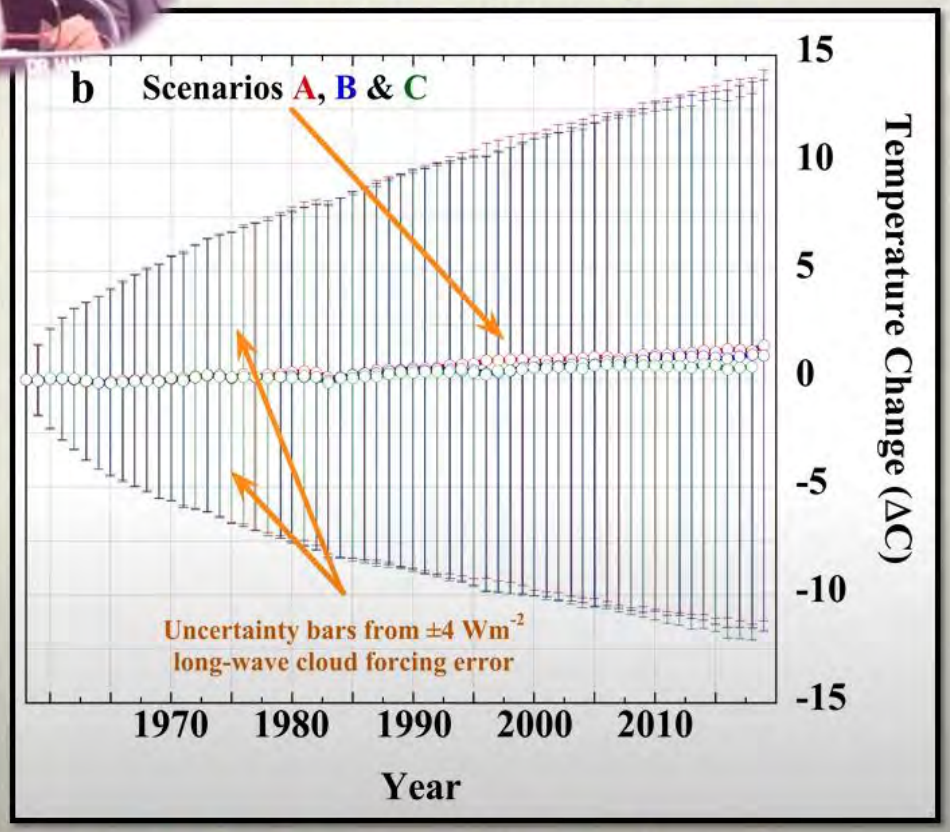
A Historic Example

GISS Model II air temperature projections presented to Congress in 1988 by Dr. James Hansen of NASA/GISS

As Originally Presented



With Uncertainty Bars



Uncertainty due to cloud error alone makes scenarios A, B & C non-predictive, physically indistinguishable, and meaningless.

Presented to the Senate Committee on Energy and Natural Resources, 23 June 1988.
Published in: J. Hansen, et al. (1988) *J. Geophys. Res.* 93(D8), 9341-9364.

Science Mag: “Missed wind patterns are throwing off climate forecasts of rain and storms”, July 29, 2020

- **Excerpts:**
- For example, models predicted that the Horn of Africa, which is heavily influenced by Indian Ocean winds, would get wetter with climate change. But since the early 1990s, rains have plummeted, and the region has dried.
- **What’s not clear yet is why climate models get circulation changes so wrong.**
- But until modelers figure out how to confidently forecast changes in the winds, Smith says, **“We can’t take the models at face value."**

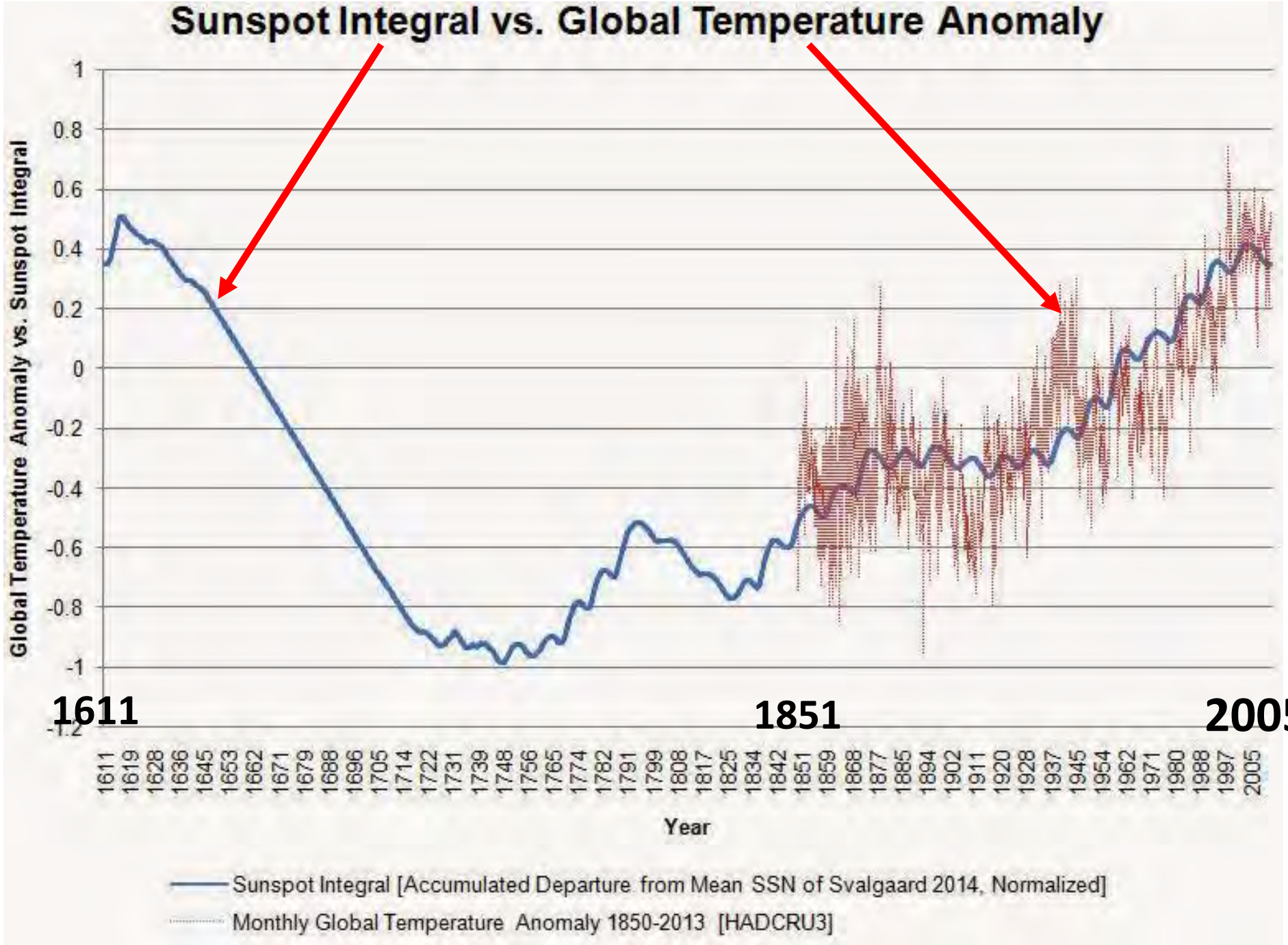
- I believe the largest model errors are the result of a lack of knowledge of the temperature dependent changes in clouds and precipitation efficiency (thus free-tropospheric vapor, thus water vapor “feedback”) that actually occur in response to a long-term forcing of the system from increasing carbon dioxide.
- My main complaint is that modelers are either deceptive about, or unaware of, the uncertainties in the myriad assumptions — both explicit and implicit — that have gone into those models.
- September 11th, 2019 by Roy W. Spencer, Ph. D.

ECS = Equilibrium Climate Sensitivity

- ECS = What will be the increase in average global temperature when and if CO2 is double pre-industrial levels, or 560 ppm.
- ECS has been estimated as between 1.5 (insignificant) and 4.5 (worrisome)
- Since we're halfway there (from 280, now at 410 or so) we should use the last 40 years' experience to estimate ECS. The result is 1.2 – 1.3 Less than insignificant.
- We could rely on the climate models, which are now saying 4.5 and up to 5.2, 5.3
- **Has the modeling been wrong for 40 years? Is it wrong now? What about observation, which is supposed to rule in science? The scientific method says observation trumps theoretical modeling.**
- By David Wojick October 20th, 2020 CFACT

- These flawed models are the **ONLY** support for the hypothesis that CO_2 is driving “climate change”

- These models which have failed in **EVERY** measurable projection they have made are still relied on to justify a solution by eliminating CO_2


Sunspot Integral vs. Global Temperature Anomaly
Global Temperature Anomaly vs. Sunspot Integral
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
1611
1851
2005
1611 1619 1628 1636 1645 1653 1662 1671 1679 1688 1696 1705 1714 1722 1731 1739 1748 1756 1765 1774 1782 1791 1799 1808 1817 1825 1834 1842 1851 1859 1868 1877 1885 1894 1902 1911 1920 1928 1937 1945 1954 1962 1971 1980 1988 1997 2005
Year
Sunspot Integral [Accumulated Departure from Mean SSN of Svalgaard 2014, Normalized]
Monthly Global Temperature Anomaly 1850-2013 [HADCRU3]

NEW STUDY 12/2017

- COSMIC RAYS, SOLAR ACTIVITY HAVE MUCH GREATER IMPACT ON EARTH'S CLIMATE THAN MODELS SUGGEST
- **The impact of changes in solar activity on Earth's climate was up to seven times greater than climate models suggested according to new research published today in Nature Communications.**
  - Svensmark, H., Enghoff, M.B., Shaviv, N.J. *et al.* Increased ionization supports growth of aerosols into cloud condensation nuclei. *Nat Commun* **8,** 2199 (2017). https://doi.org/10.1038/s41467-017-02082-2
- More cloud condensation nuclei mean more clouds and a colder climate, and vice versa.

- Whichever way we estimate it, however, the CERES data shows that the net effect of clouds is **negative**, not positive as the models claim.
  - **Clouds and the Earth's Radiant Energy System (CERES) NASA Project**

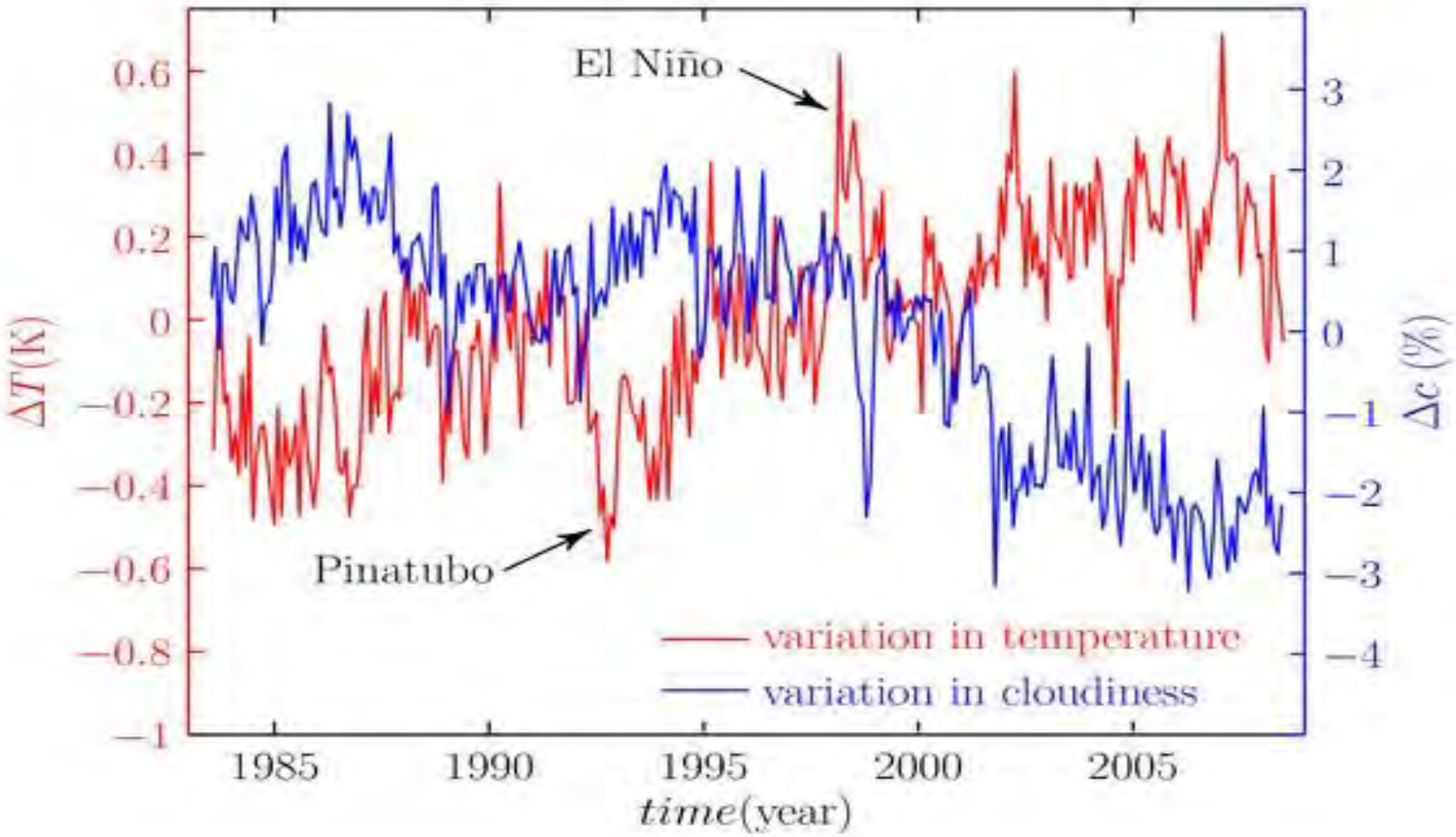


FIGURE 2. [2] Global temperature anomaly (red) and the global low cloud cover changes (blue) according to the observations. The anomalies are between summer 1983 and summer 2008. The time resolution of the data is one month, but the seasonal signal is removed. Zero corresponds about 15°C for the temperature and 26 % for the low cloud cover.

Sea Level Issues

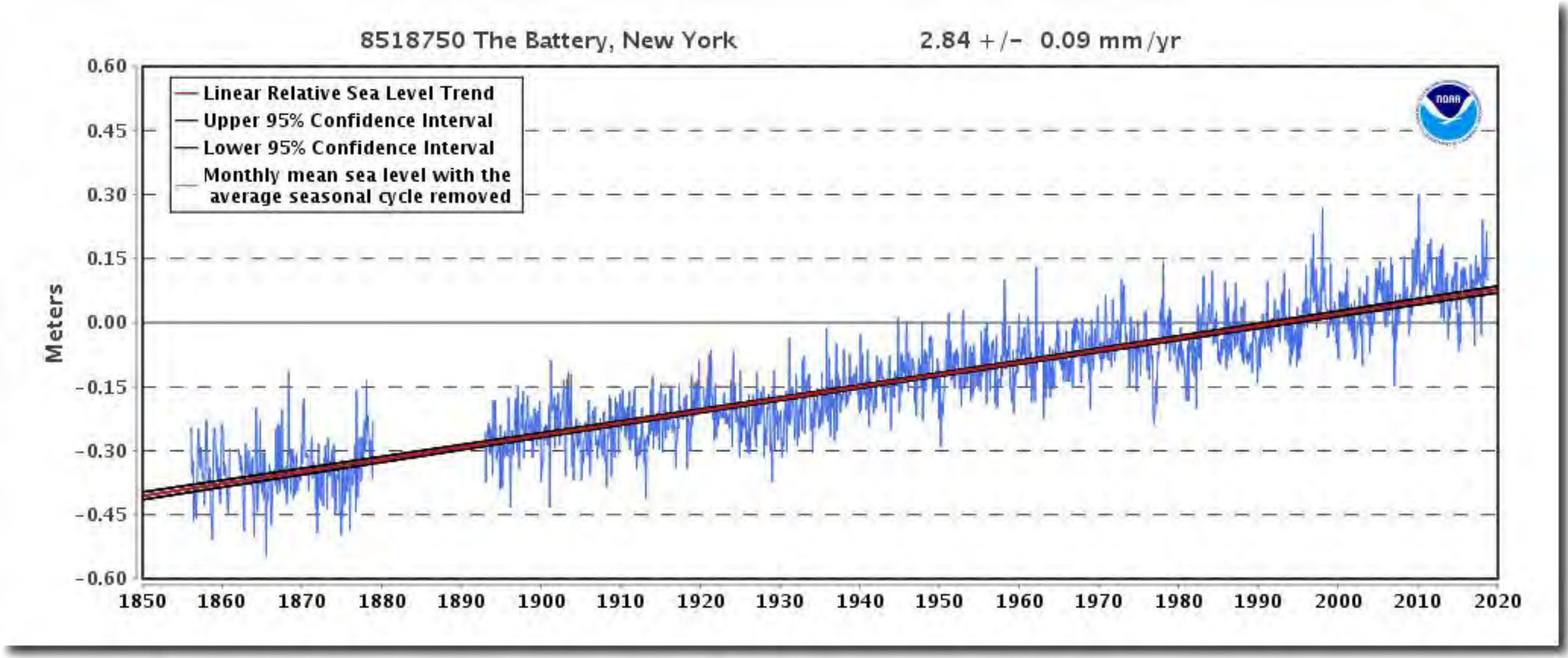
National Ocean ServiceNational Oceanic and Atmospheric AdministrationU.S. Department of Commerce

- **Is sea level rising?**
- Yes, sea level is **rising at an increasing rate**.

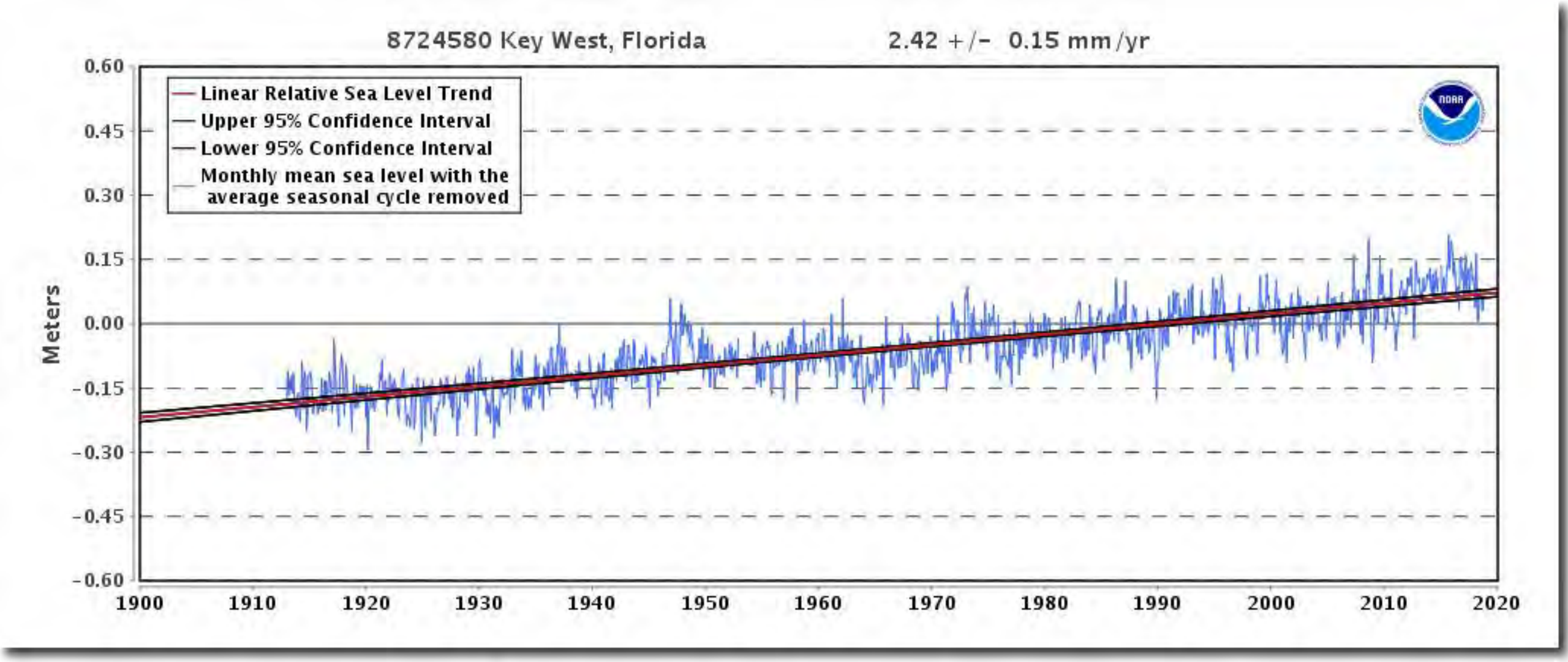
Reasons for sea level change

- The temperature of the ocean is increasing, and water expands with increasing temperature above 4 deg C
- Land-based ice is melting and not being replaced
  - 90% of earth’s fresh water is in the Antarctic
  - Sea ice makes no difference (Archimedes' Principle)
- The 3-D shape of the ocean basins are changing
  - American plate is separating from the European/African plates at 2.5 cm/year

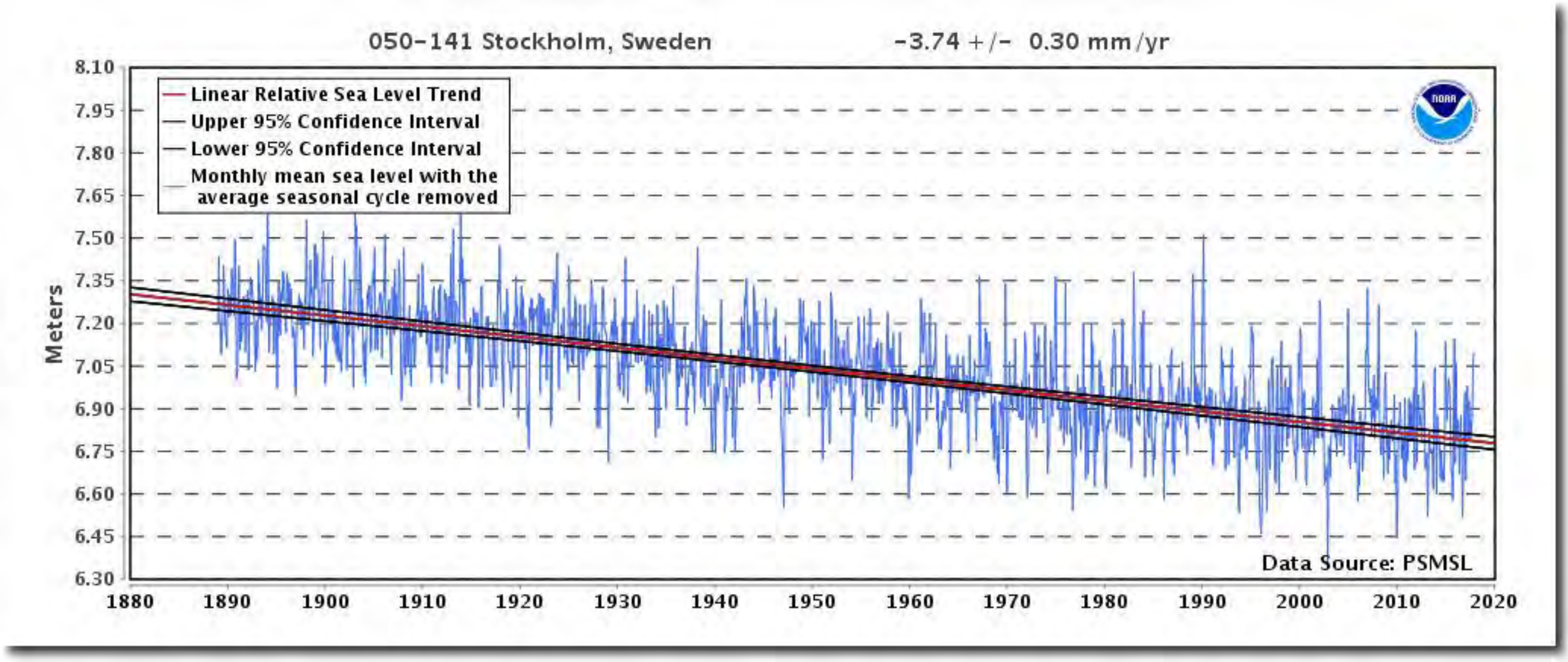
Sea level - NYC

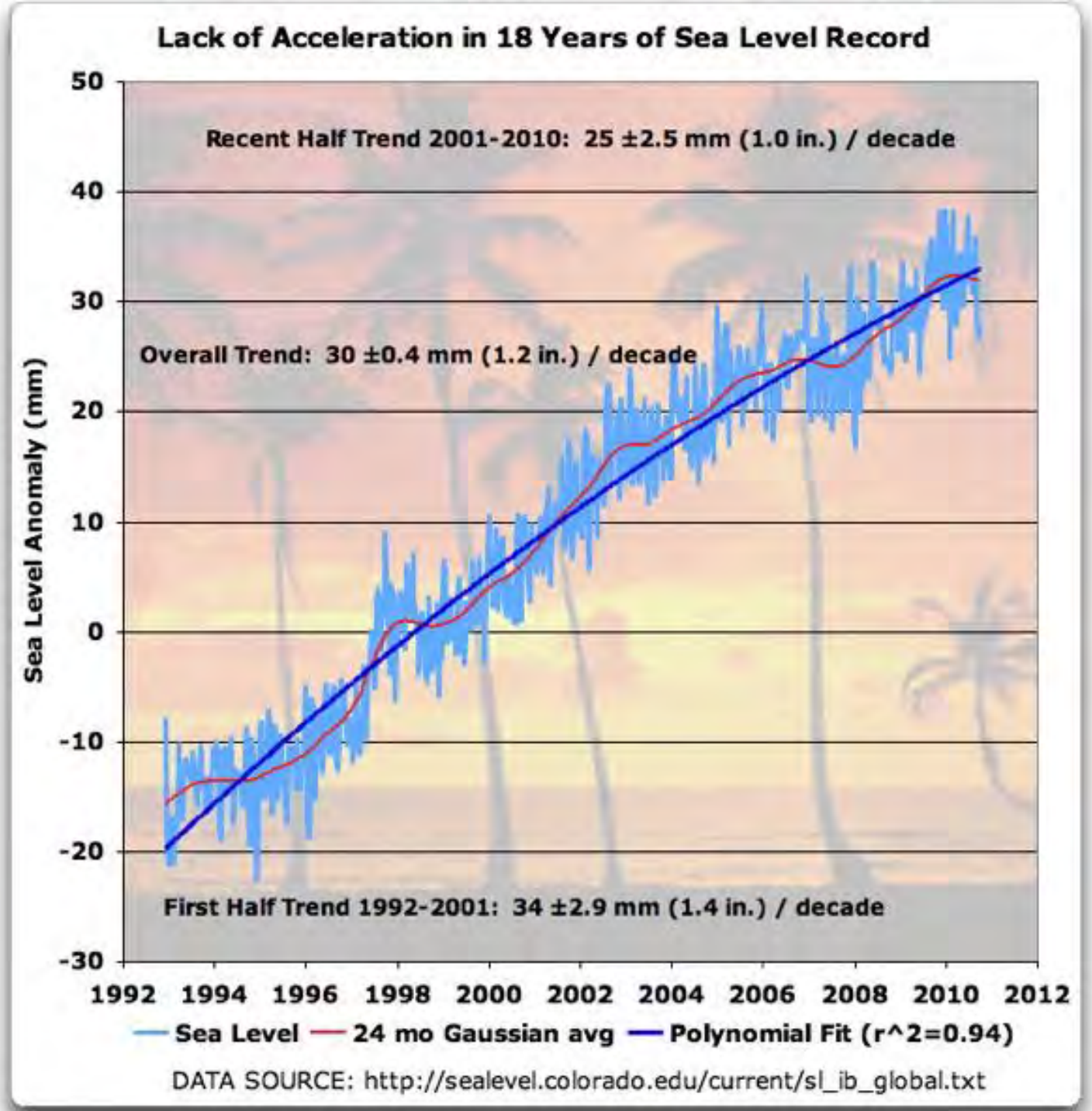


Sea level – Key West



Sea Level Trend – Stockholm, Sweden




Lack of Acceleration in 18 Years of Sea Level Record
Recent Half Trend 2001-2010: 25 ±2.5 mm (1.0 in.) / decade
Overall Trend: 30 ±0.4 mm (1.2 in.) / decade
First Half Trend 1992-2001: 34 ±2.9 mm (1.4 in.) / decade
Sea Level Anomaly (mm)
50
40
30
20
10
0
-10
-20
-30
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Sea Level
24 mo Gaussian avg
Polynomial Fit (r^2=0.94)
DATA SOURCE: http://sealevel.colorado.edu/current/sl_ib_global.txt

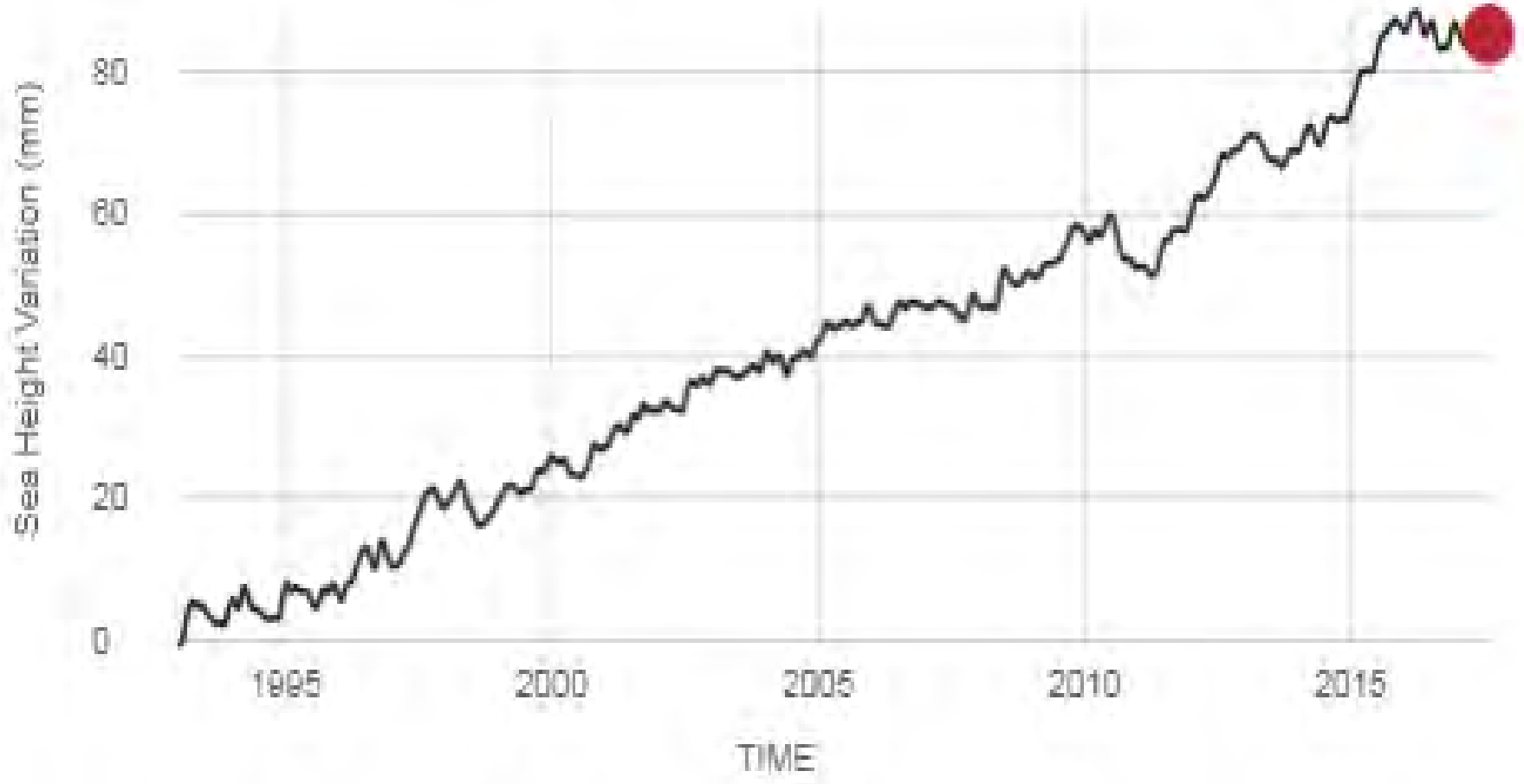
SATELLITE DATA: 1993-PRESENT

Data source: Satellite sea level observations.
Credit: NASA Goddard Space Flight Center

RATE OF CHANGE

↑ 3.4

millimeters per year
margin: ±0.4



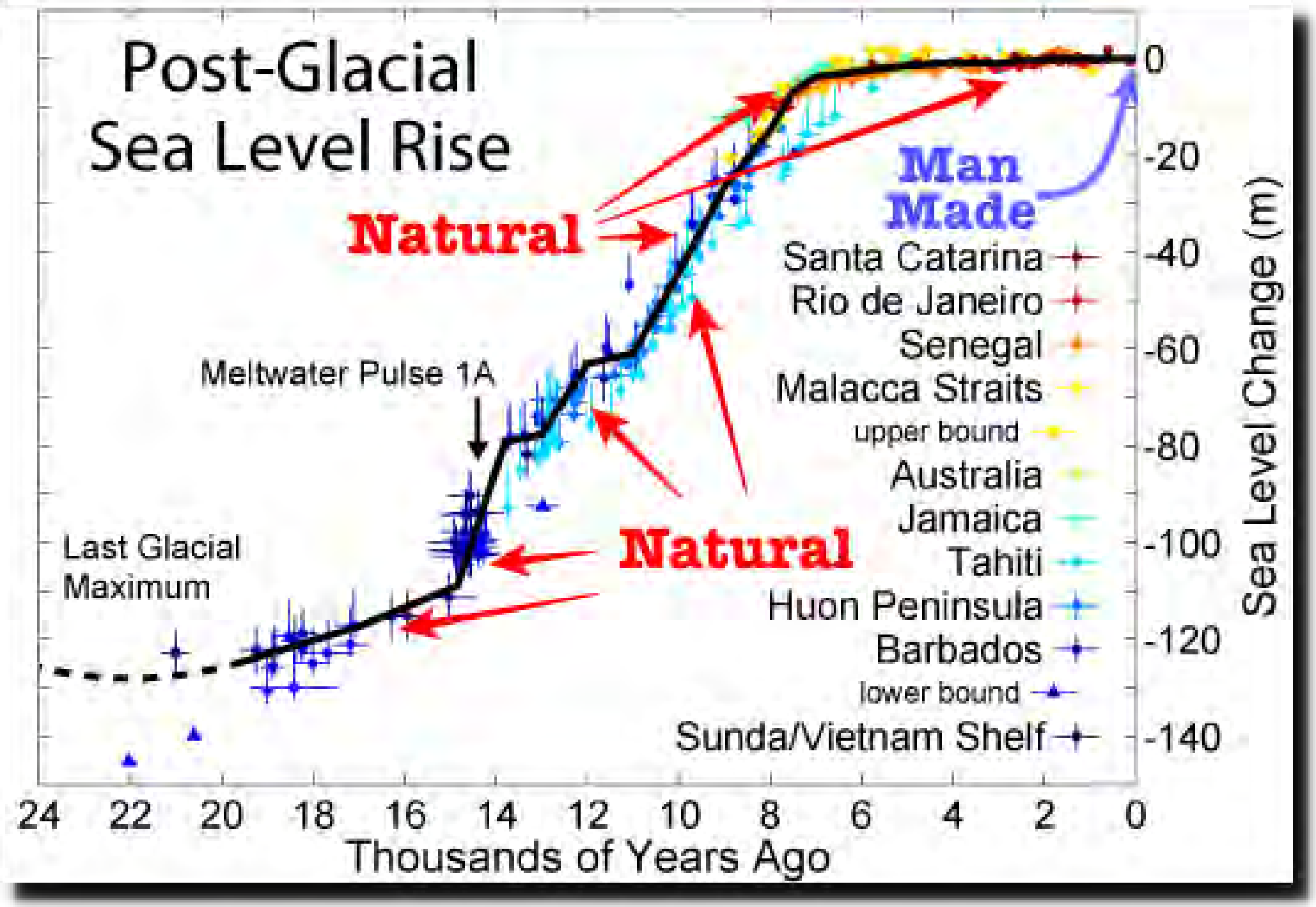
SATELLITE DATA: 1993-PRESENT

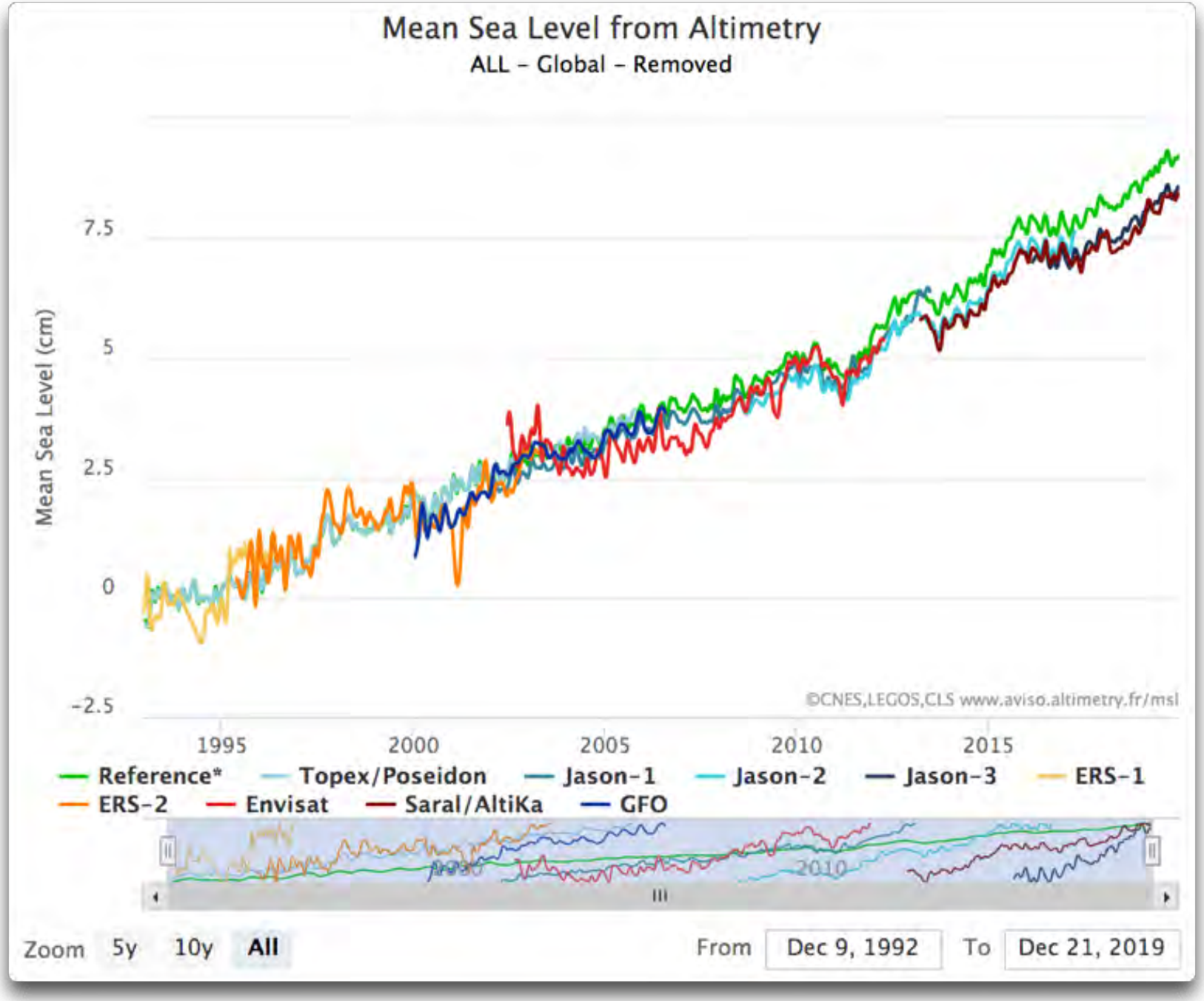
Data source: Satellite sea level observations.
Credit: NASA Goddard Space Flight Center

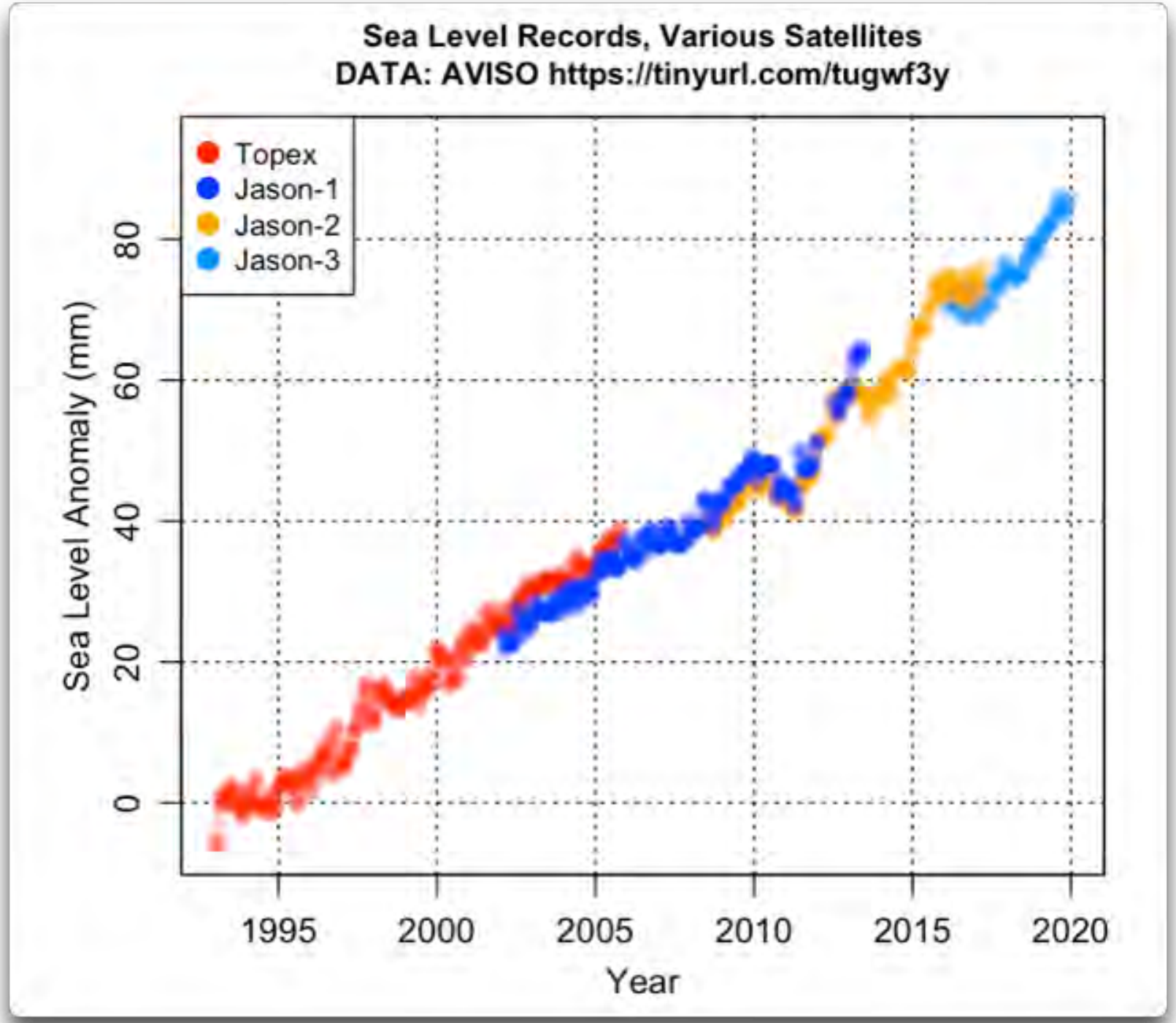
RATE OF CHANGE

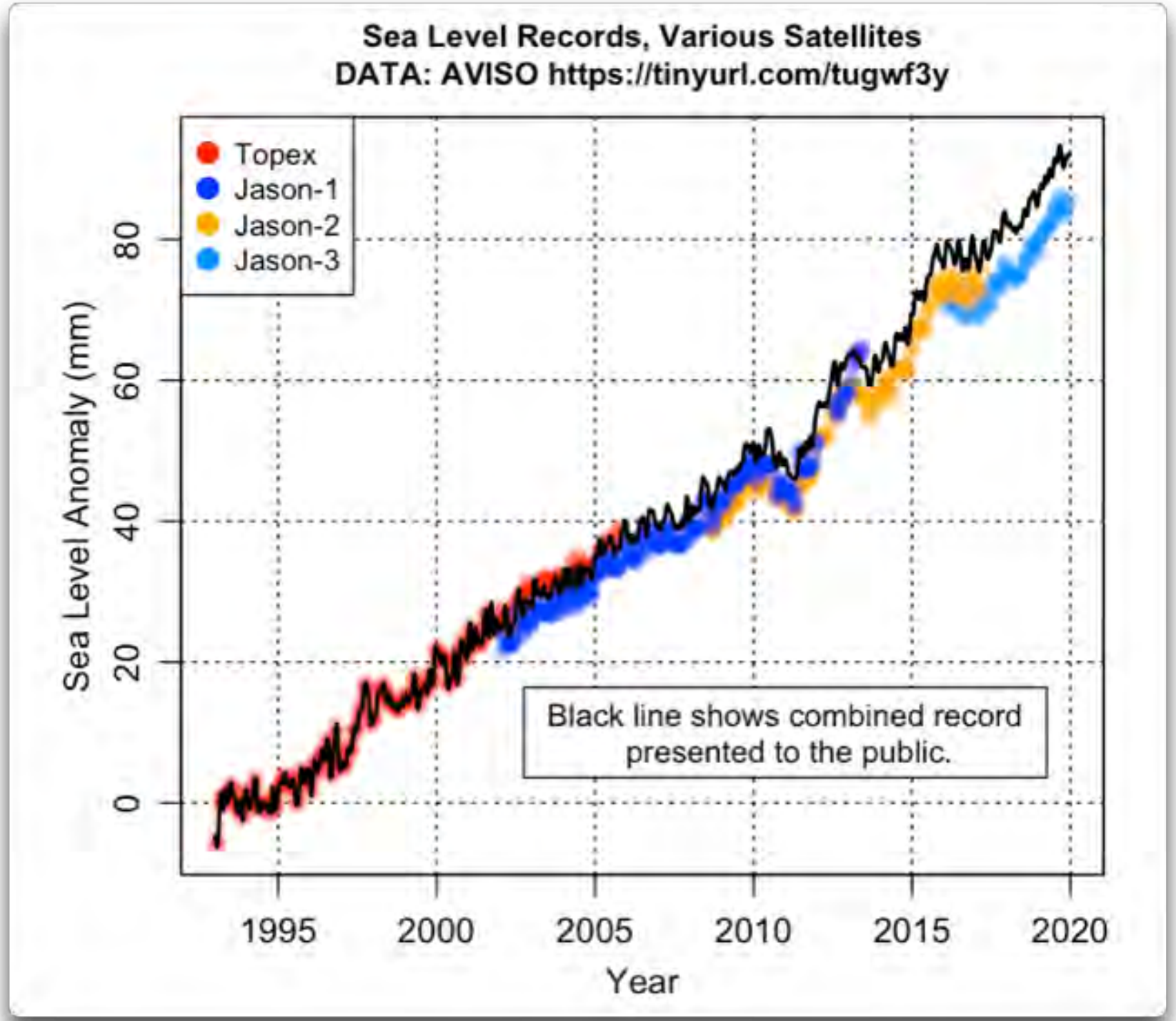
↑ 3.4

millimeters per year
margin: ±0.4


Post-Glacial
Sea Level Rise
Natural
Man
Made
Natural
Natural
Meltwater Pulse 1A
Last Glacial
Maximum
Santa Catarina
Rio de Janeiro
Senegal
Malacca Straits
upper bound
Australia
Jamaica
Tahiti
Huon Peninsula
Barbados
lower bound
Sunda/Vietnam Shelf
0
-20
-40
-60
-80
-100
-120
-140
Sea Level Change (m)
24
22
20
18
16
14
12
10
8
6
4
2
0
Thousands of Years Ago


Mean Sea Level from Altimetry
ALL - Global - Removed
Mean Sea Level (cm)
7.5
5
2.5
0
-2.5
1995
2000
2005
2010
2015
©CNES,LEGOS,CLS www.aviso.altimetry.fr/msl
Reference*
Topex/Poseidon
Jason-1
Jason-2
Jason-3
ERS-1
ERS-2
Envisat
Saral/AltiKa
GFO
Zoom
5y
10y
All
From
Dec 9, 1992
To
Dec 21, 2019


Sea Level Records, Various Satellites
DATA: AVISO https://tinyurl.com/tugwf3y
Topex
Jason-1
Jason-2
Jason-3
Sea Level Anomaly (mm)
0
20
40
60
80
1995
2000
2005
2010
2015
2020
Year


Sea Level Records, Various Satellites
DATA: AVISO https://tinyurl.com/tugwf3y
Topex
Jason-1
Jason-2
Jason-3
Black line shows combined record presented to the public.
Sea Level Anomaly (mm)
0
20
40
60
80
1995
2000
2005
2010
2015
2020
Year

Tuvalu Island Nation and Sea Level Rise

- Tuvalu’s worry about seal level rise caused UN statement to limit global temperature rise to 1.5 deg C.

- In the four decades to 2014, [1971 to 2014] Tuvalu's total land area grew by 73 hectares, or 2.9 per cent. (RMIT ABC Fact Check)

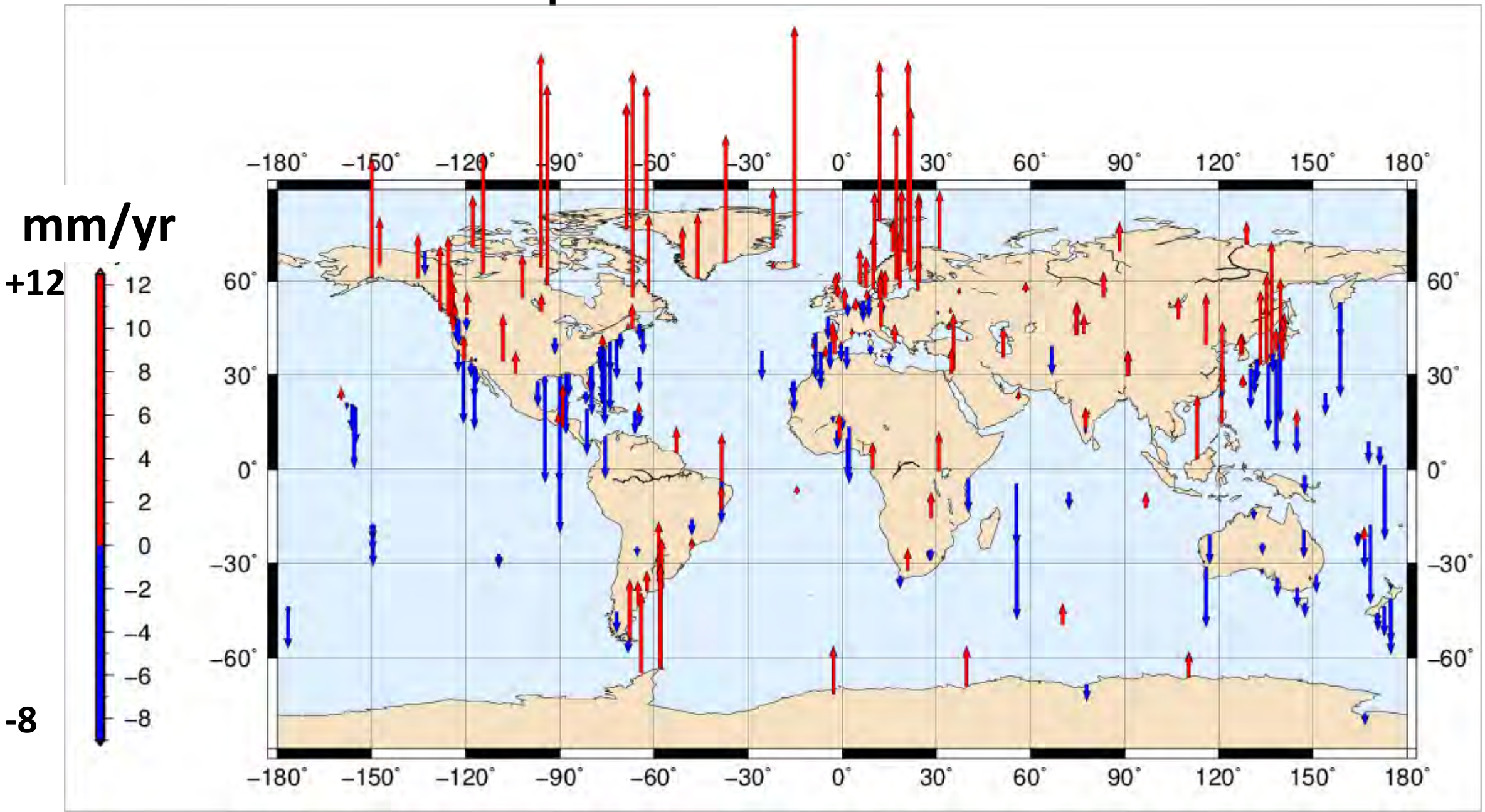
- There is no scientific basis for the arbitrary limit of 1.5 deg C

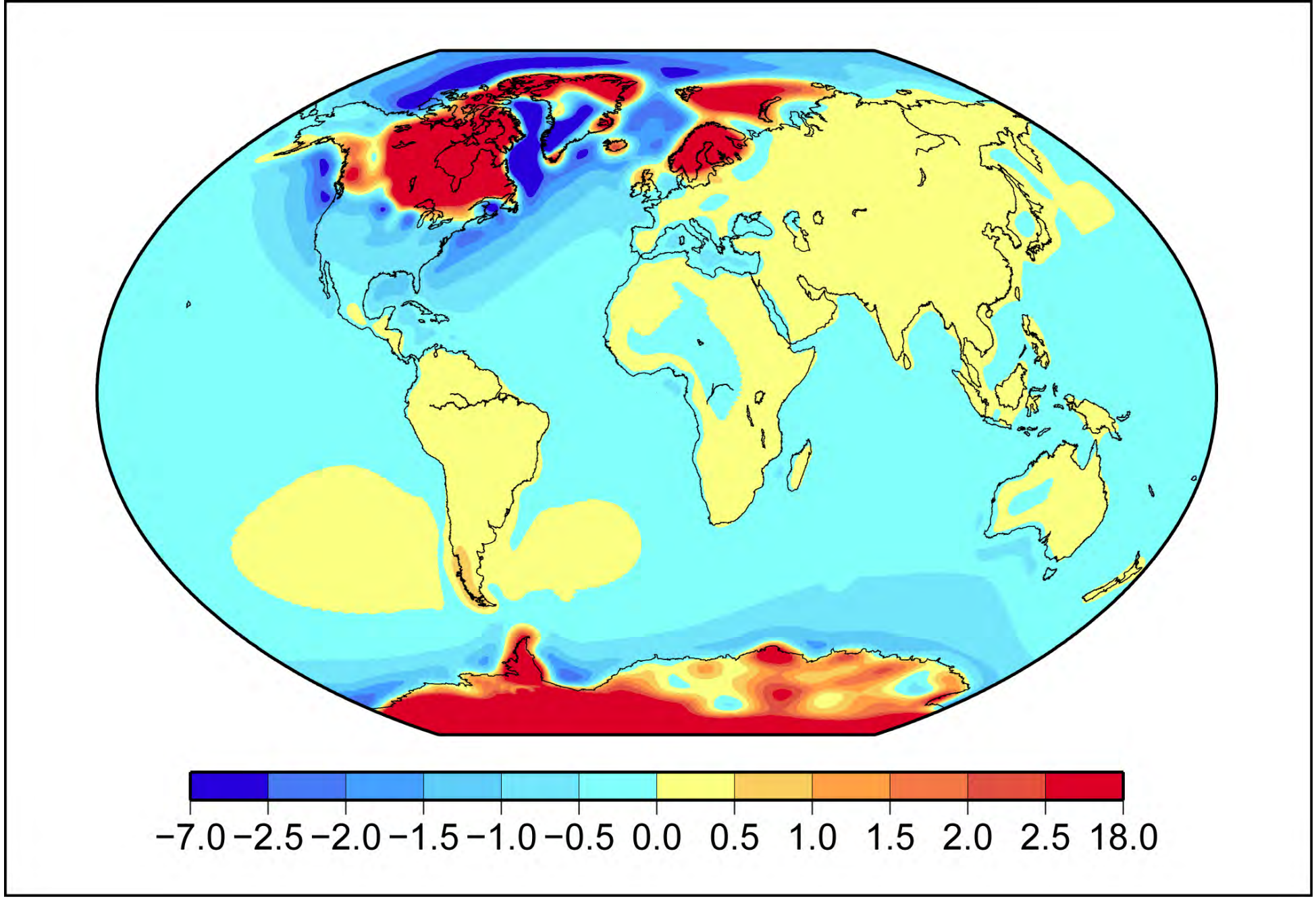
Maldives Threat of Drowning

- Former president Mohamed Nasheed has been highly outspoken about this issue, saying in 2012 that "If carbon emissions continue at the rate they are climbing today, my country will be under water in seven years.“
- "First of all, I want give you a bit of good news. The good news is that the Maldives is not about to disappear," President Waheed said countering the claims by his predecessor that the Maldives would be be completely submerged in the near future August 24, 2012
- “Egg on Their Faces: The Maldives Still Above the Waves 30 Years After Environmentalist Prediction”

- Maldives to open five new airports in 2019

Subsidence and Uplift




−7.0 −2.5 −2.0 −1.5 −1.0 −0.5 0.0 0.5 1.0 1.5 2.0 2.5 18.0

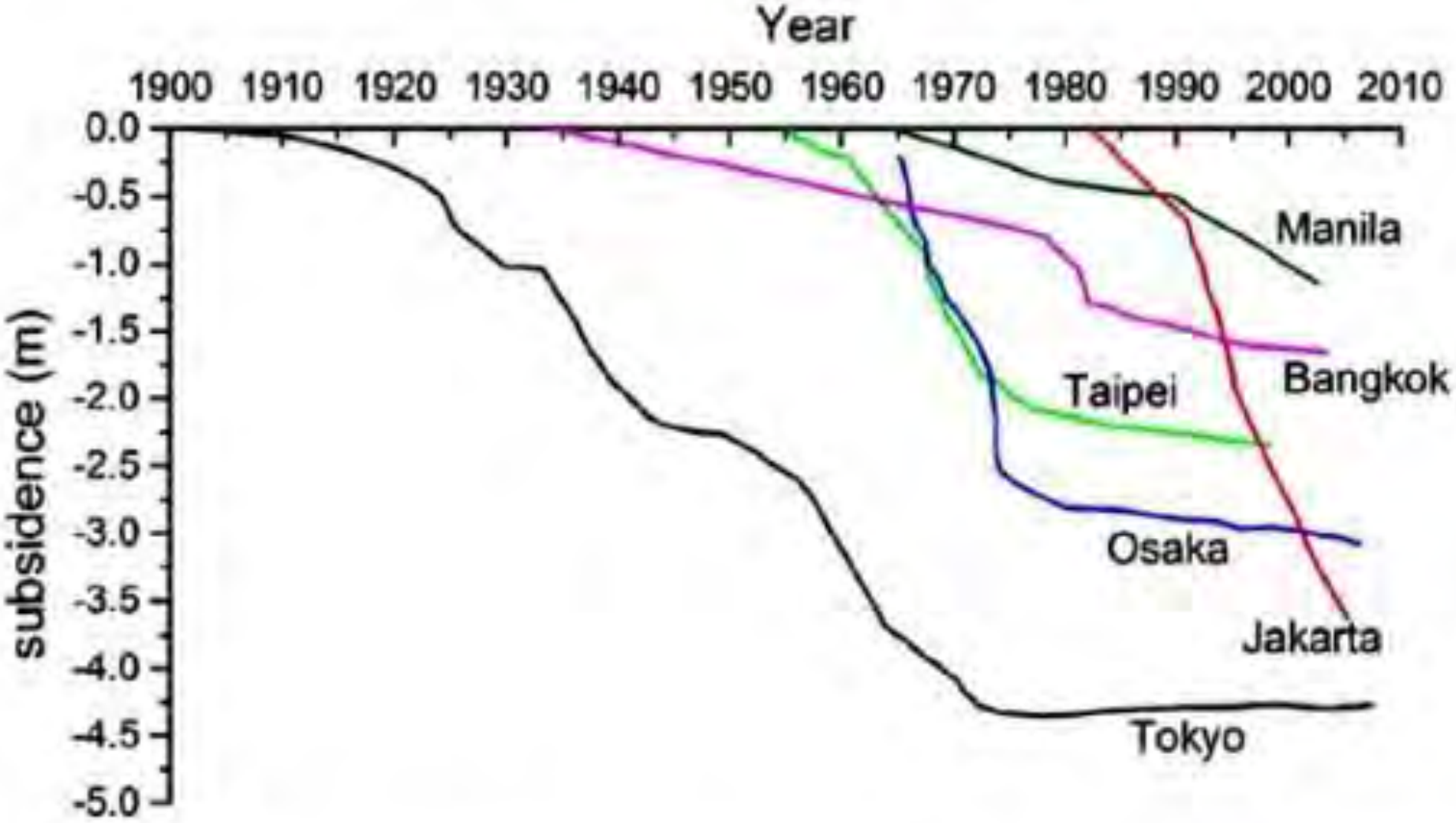
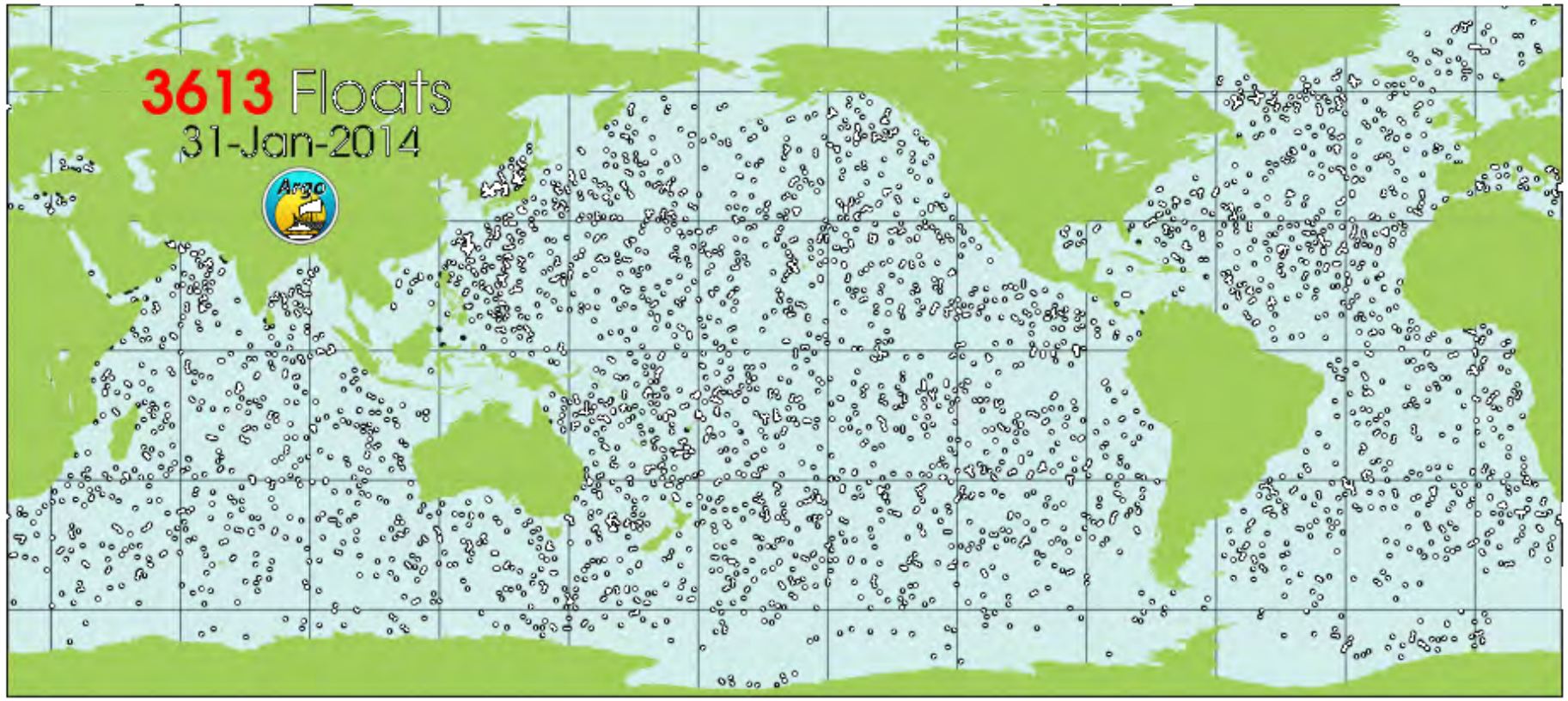


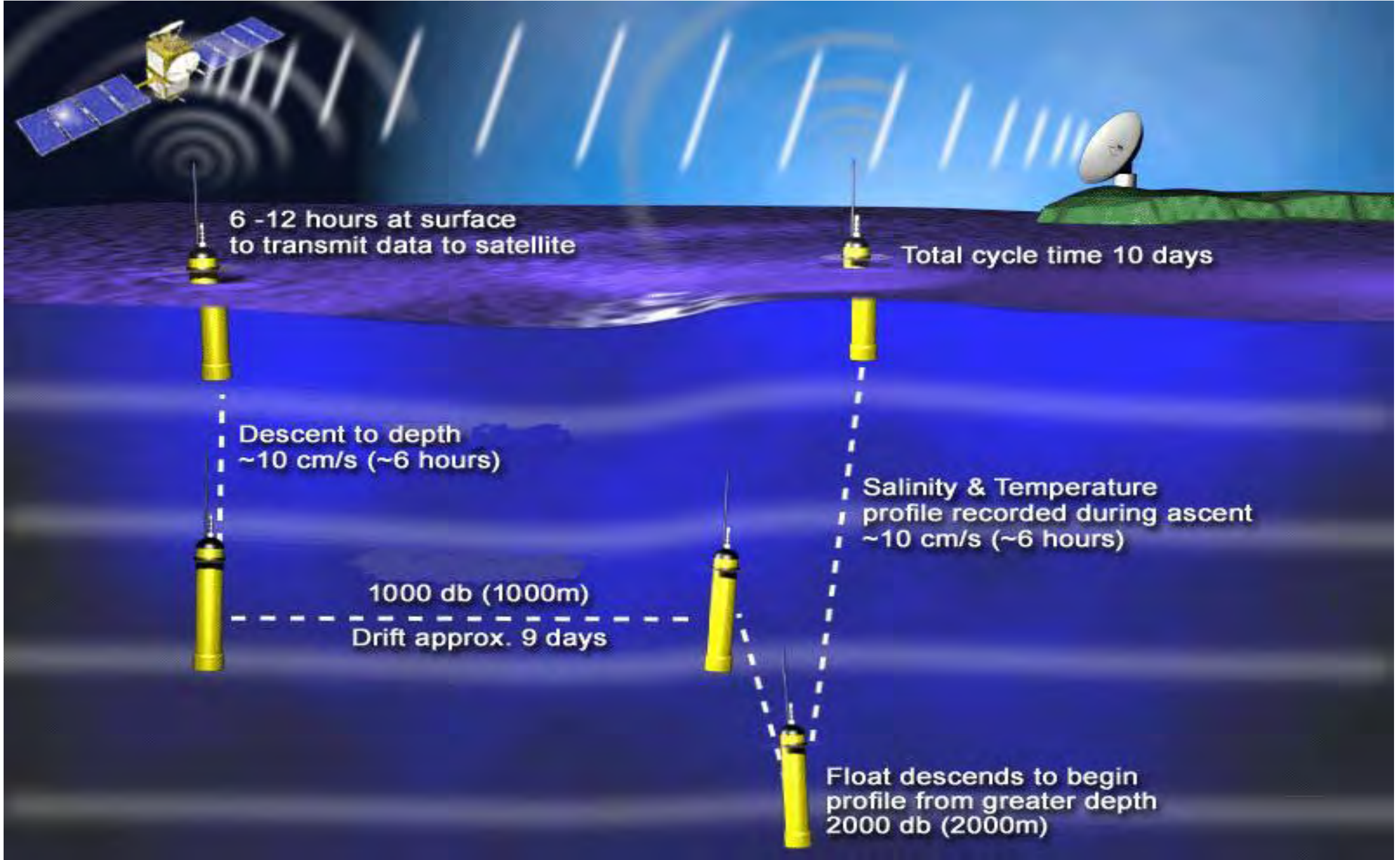
Fig. 6. Land subsidence in Asian megacities (drawn by the authors using data from Kaneko and Toyota, 2011).

- Jakarta, like many Asian mega-cities, is built on mostly swampy land where several rivers run into the sea. Skyscrapers and mega-cities should not be built on swamps — the soil beneath the city will compact and subside under the weight of modern development.
- Jakarta, like many Asian mega-cities, has been pumping fresh water out of aquifers directly beneath the city for decades. The city is sinking into the void created by this ground water extraction.
- The government of Indonesia and the city fathers of Jakarta are fully aware that their problem is not global sea level rise. **Only the international press, powered by climate change advocacy, dares make the claim against all evidence to the contrary**

Ocean Temperature and pH Issues

ARGO Ocean Floats




6 -12 hours at surface
to transmit data to satellite
Total cycle time 10 days
Descent to depth
~10 cm/s (~6 hours)
Salinity & Temperature
profile recorded during ascent
~10 cm/s (~6 hours)
1000 db (1000m)
Drift approx. 9 days
Float descends to begin
profile from greater depth
2000 db (2000m)

Very small temperature scale

1 unit here is about 0.01 deg C

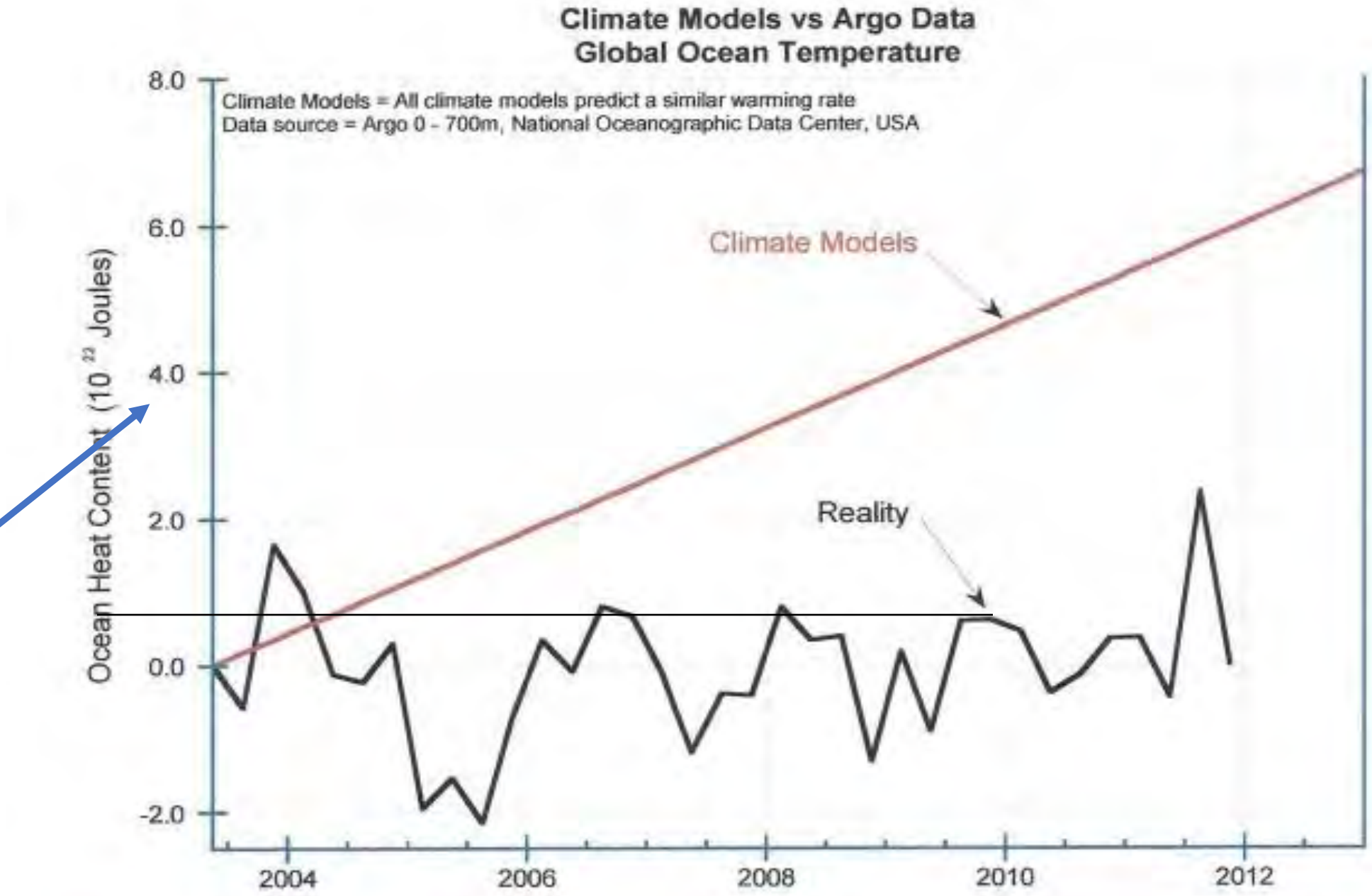


Figure 5: Climate model predictions[11] of ocean temperature, versus the measurements by Argo[17]. The unit of the vertical axis is 10^{22} Joules (about 0.01°C).

Ocean pH

- Many people think that the ocean has only one pH everywhere. Other people think that the oceanic pH is different in different places, but is constant over time. Neither view is correct.
- Next slide is a view of a transect of the north Pacific ocean from Alaska to Hawaii, with Hawaii on the top left, Alaska on the top right, and depths shown vertically. ocean pH along transect
- Fish often have a slimy kind of mucus that covers their entire bodies … to keep from slowly dissolving in the slightly alkaline ocean.
- We can drink lemon juice pH~2 and can tolerate food only as alkaline as about 8

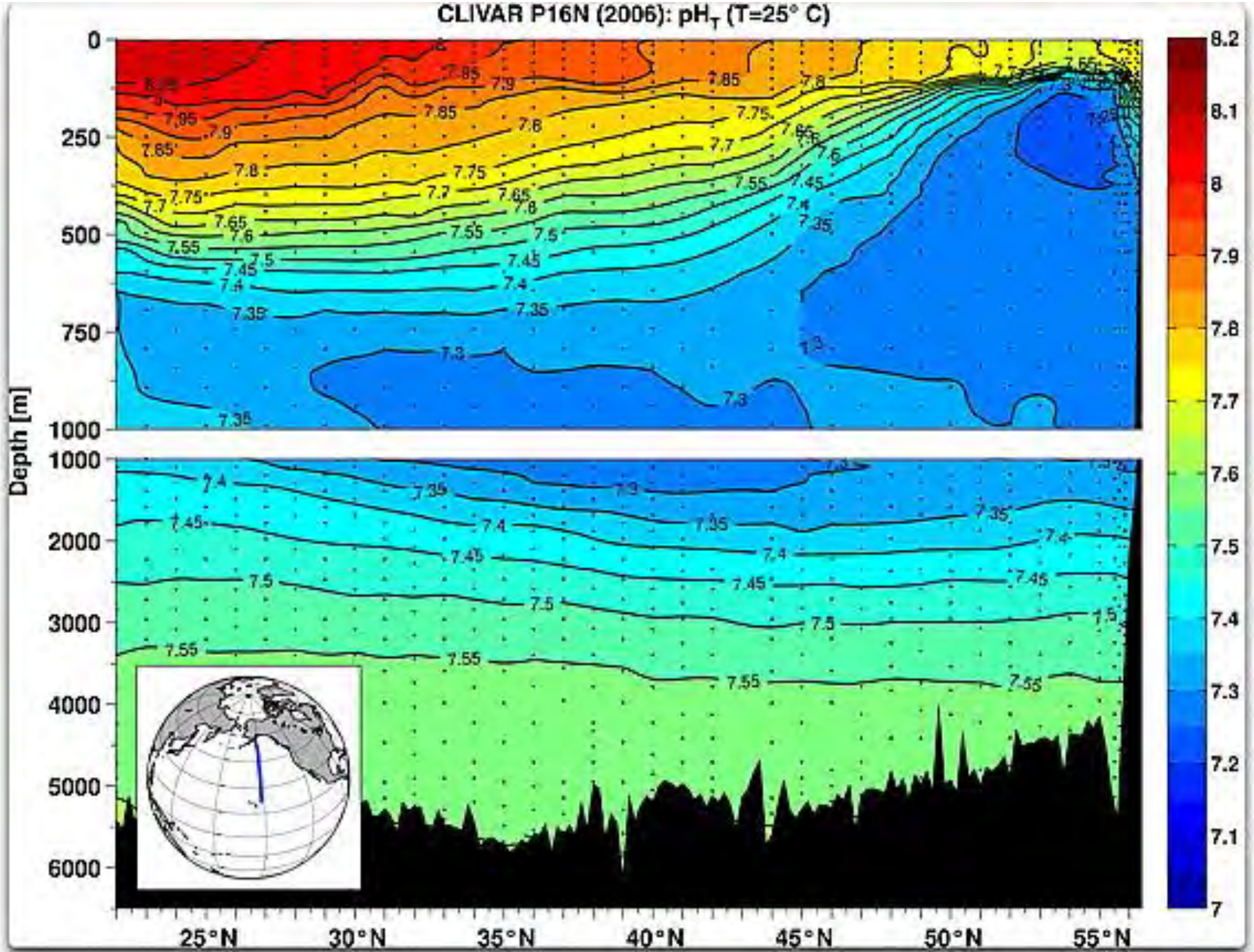
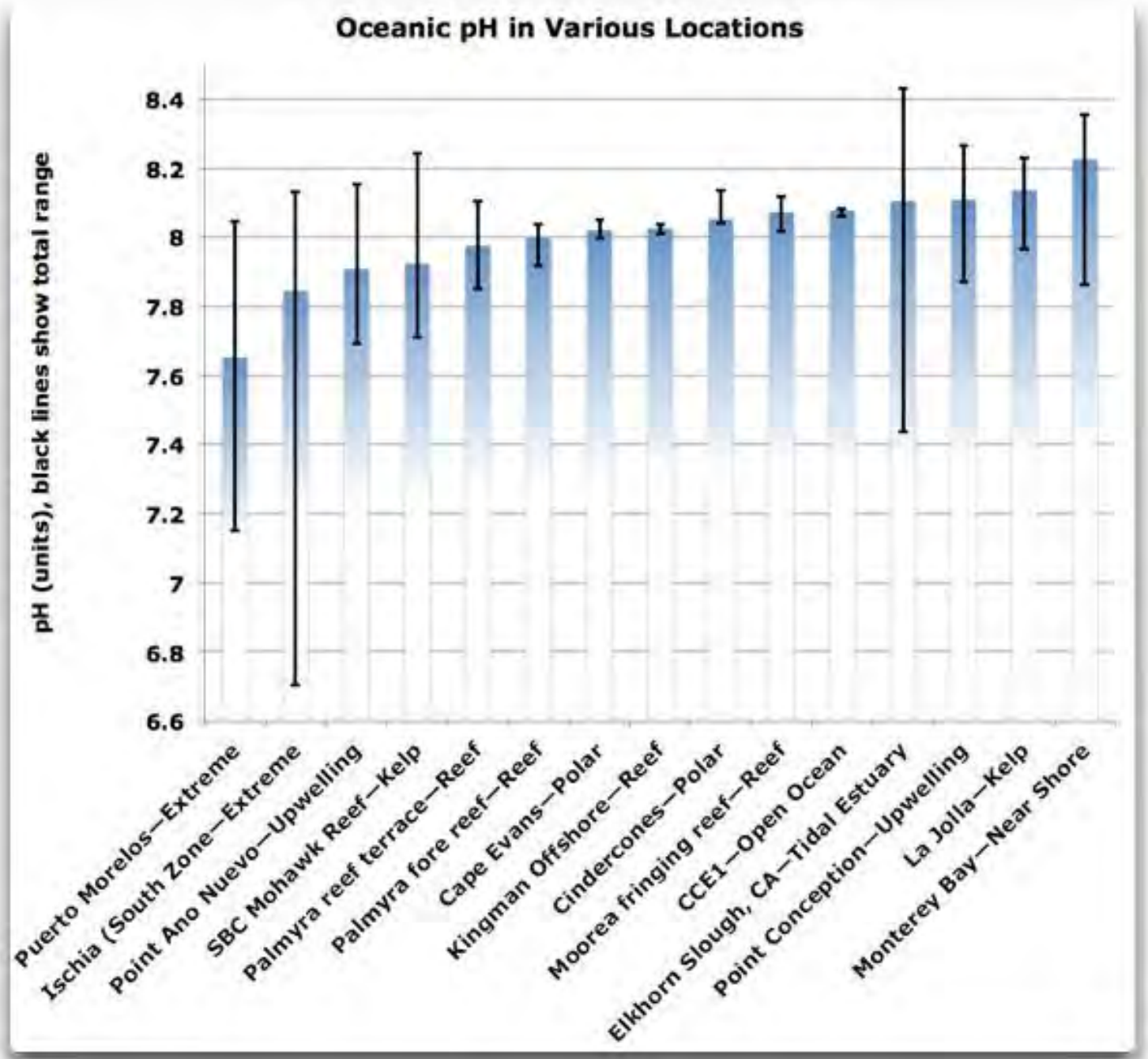


Figure 1. Variation in pH by latitude and depth.


Oceanic pH in Various Locations
pH (units), black lines show total range
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
Puerto Morelos—Extreme
Ischia (South Zone—Extreme
Point Ano Nuevo—Upwelling
SBC Mohawk Reef—Kelp
Palmyra reef terrace—Reef
Palmyra fore reef—Reef
Cape Evans—Polar
Kingman Offshore—Reef
Cindercones—Polar
Moorea fringing reef—Reef
CCE1—Open Ocean
Elkhorn Slough, CA—Tidal Estuary
Point Conception—Upwelling
La Jolla—Kelp
Monterey Bay—Near Shore

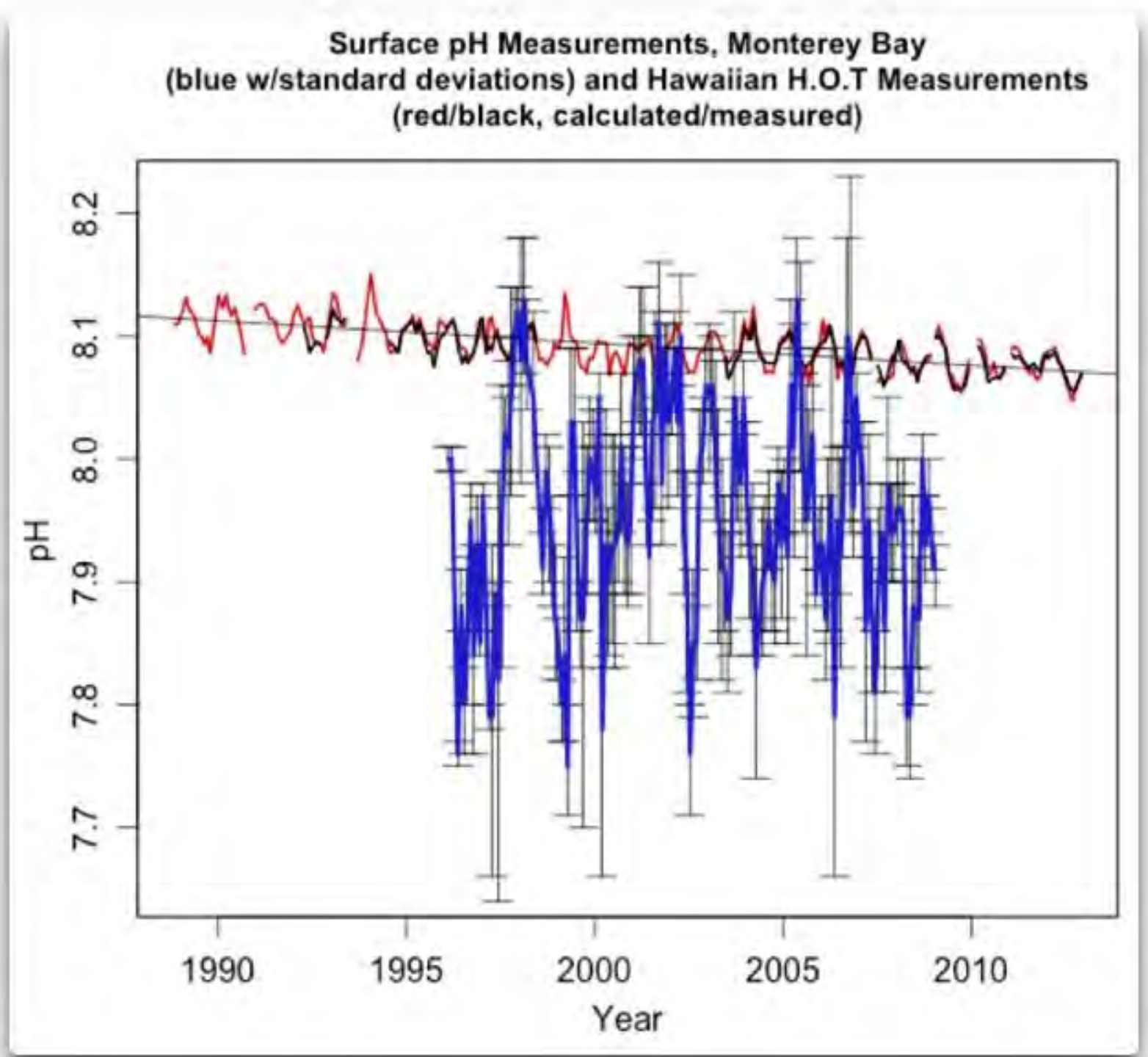
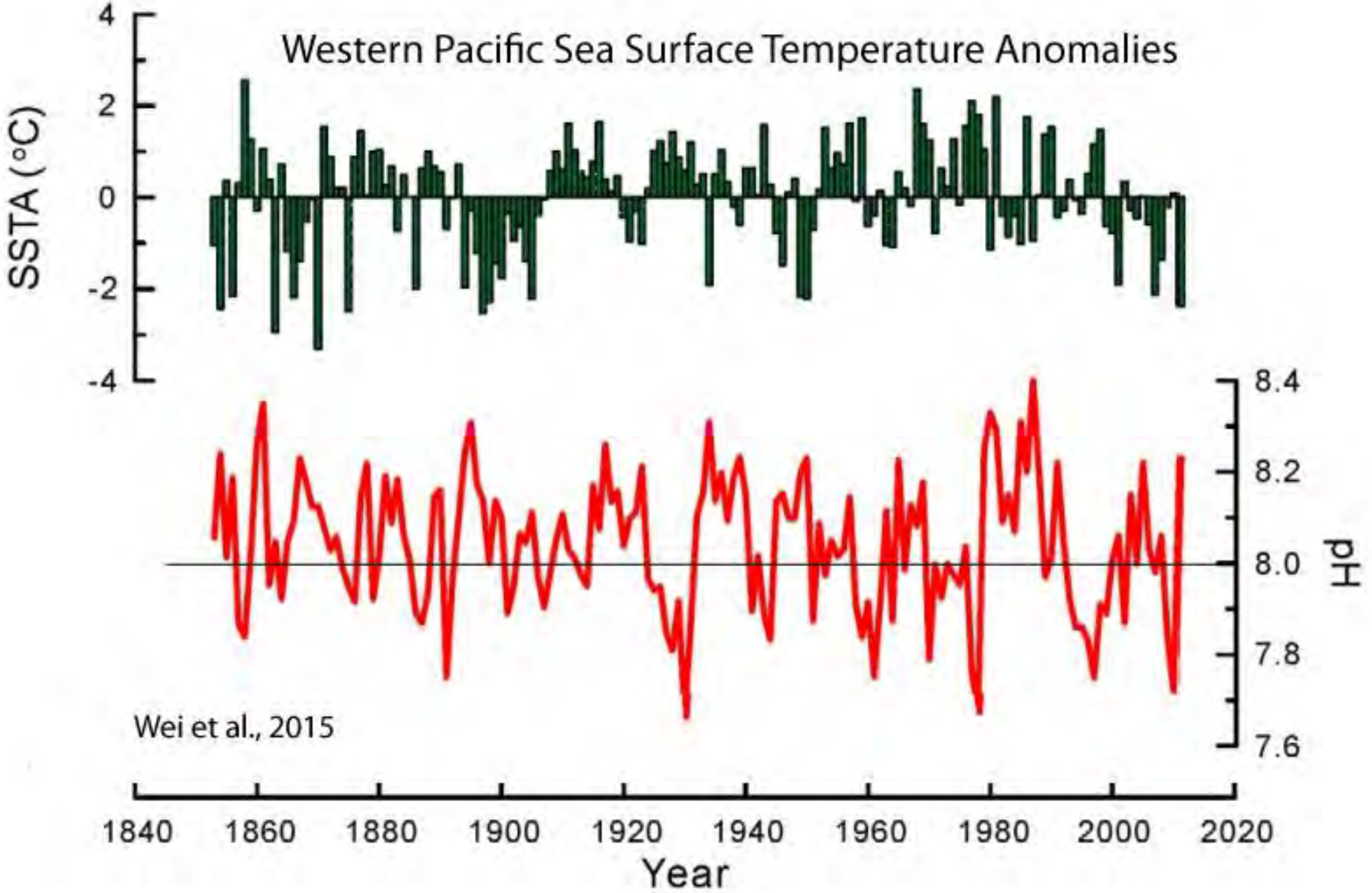


Figure 3. Surface pH measurements from HOT open ocean and Monterey Bay upwelling coastline. The Hawaii data shows both measured pH (black) and pH calculated from other measurements, e.g. dissolved inorganic carbon (DIC), total alkalinity, and salinity.

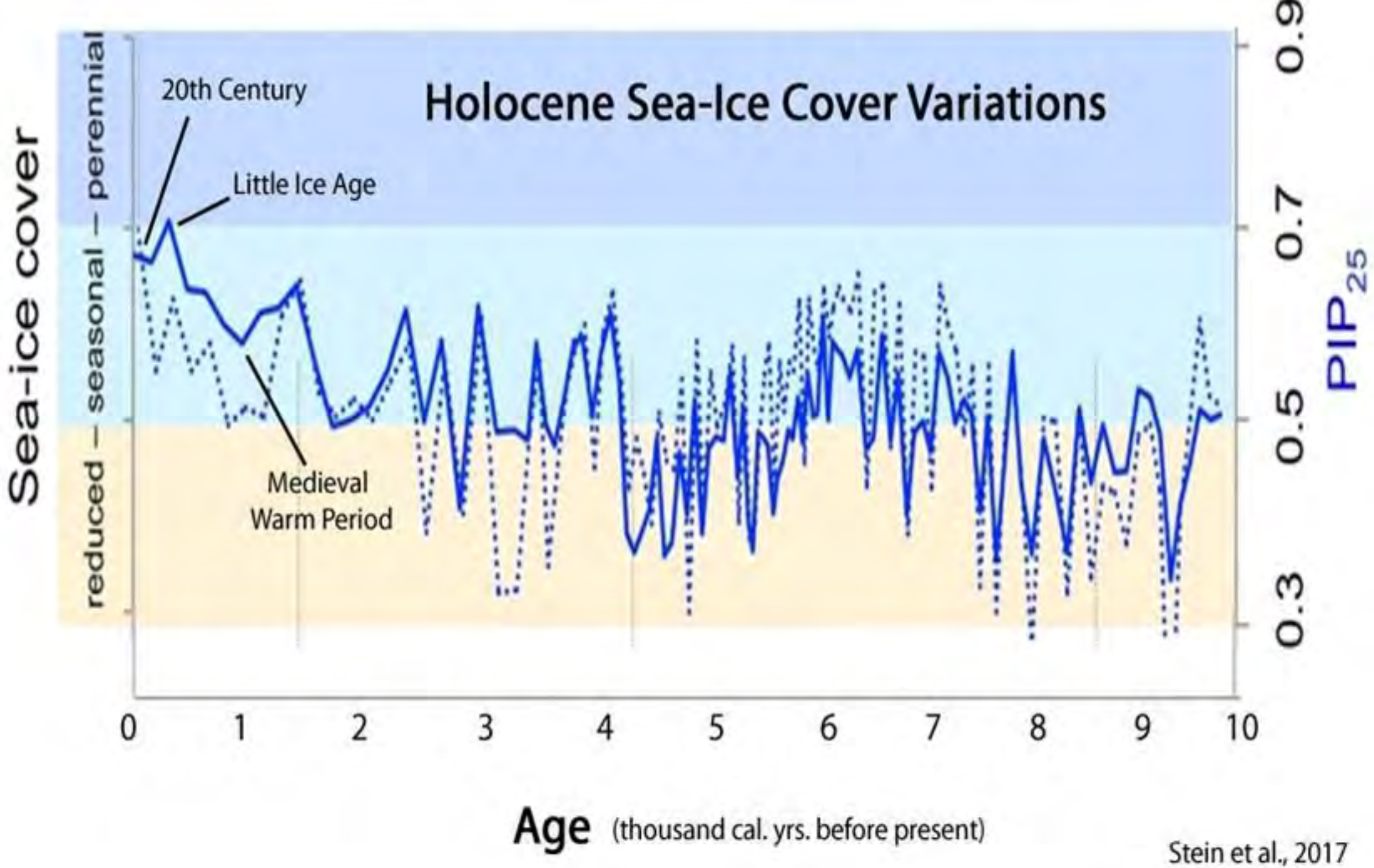

Western Pacific Sea Surface Temperature Anomalies
SSTA (°C)
4
2
0
-2
-4
8.4
8.2
8.0
7.8
7.6
pH
Wei et al., 2015
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
Year

Polar Ice Issues

NOAA’s Statement

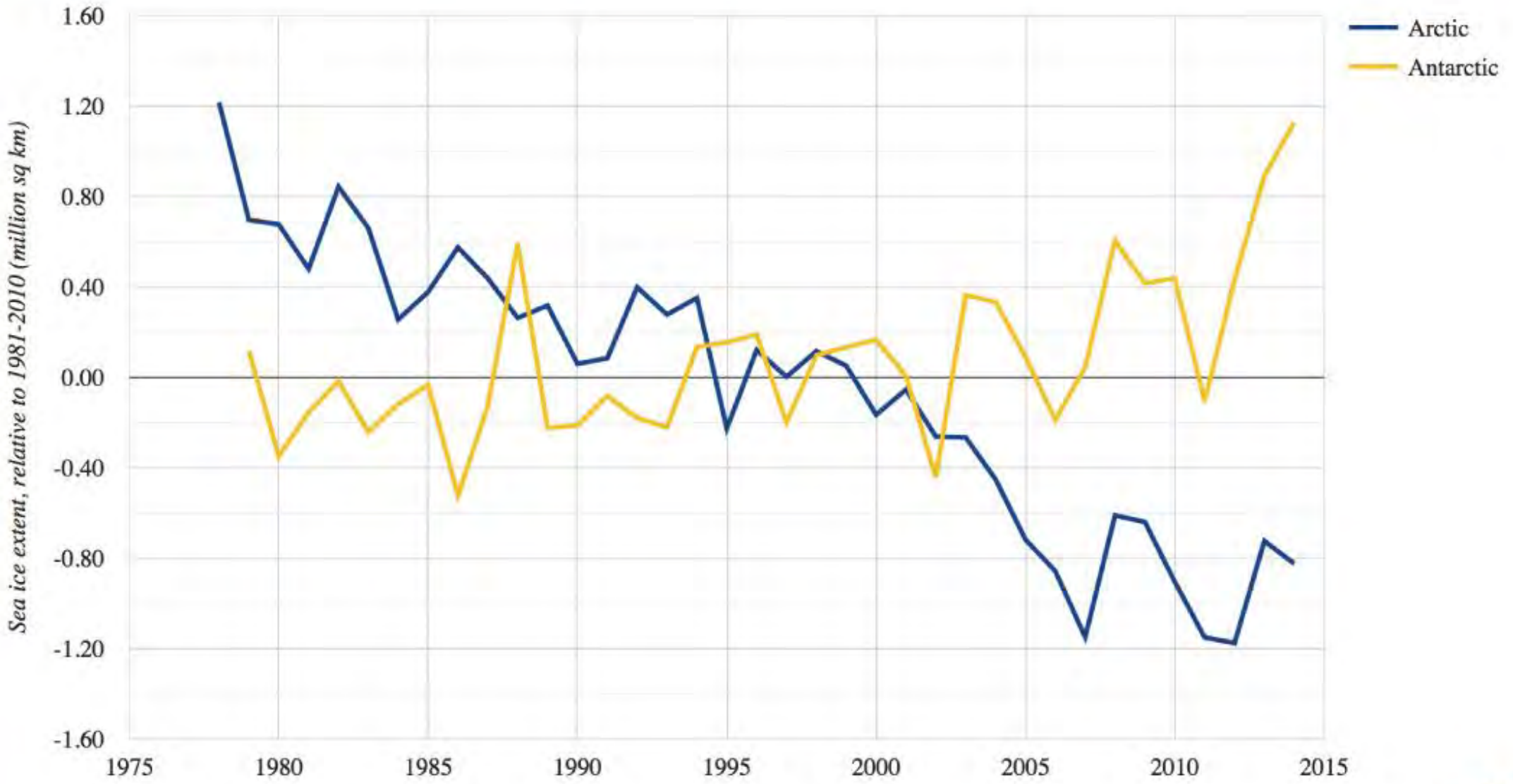
- “The Arctic is going through the most unprecedented transition in human history,” Jeremy Mathis, director of NOAA’s Arctic research program, said at a press conference. “This year’s observations confirm that the Arctic shows no signs of returning to the reliably frozen state it was in just a decade ago.”

- Two more papers have been published that further affirm the conclusion that modern Arctic sea ice extent has **not changed significantly** relative to even the last few centuries, nor has it fallen outside the range of natural variability.
- Like Stein et al. (2017), Yamamoto et al. (2017) largely attribute Holocene sea ice concentration variations to solar forcing, and they assemble a reconstruction of sea ice trends for the region that once again clearly shows sea **ice coverage is greater now** than it has been for almost all of the Holocene

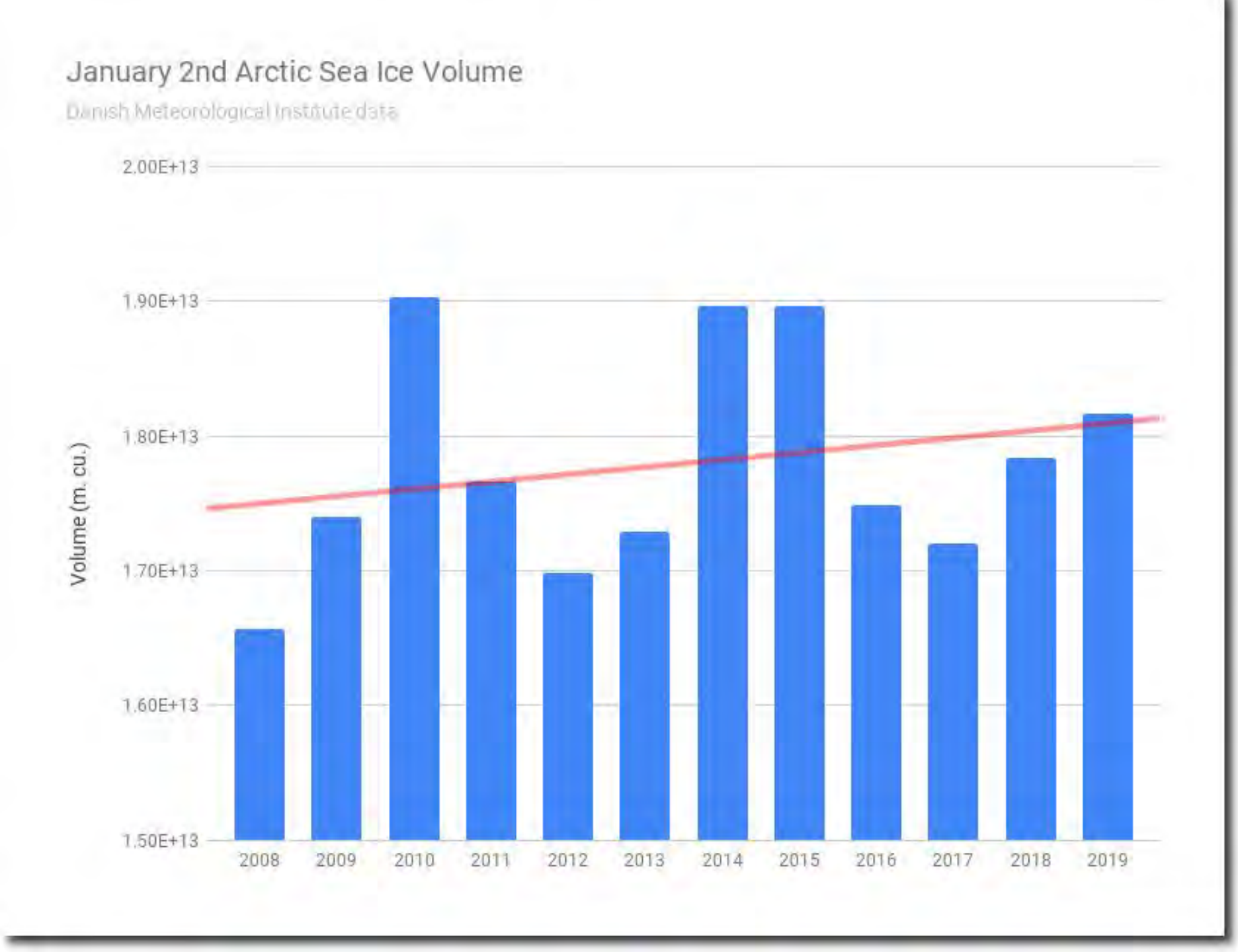


Stein et al., 2017

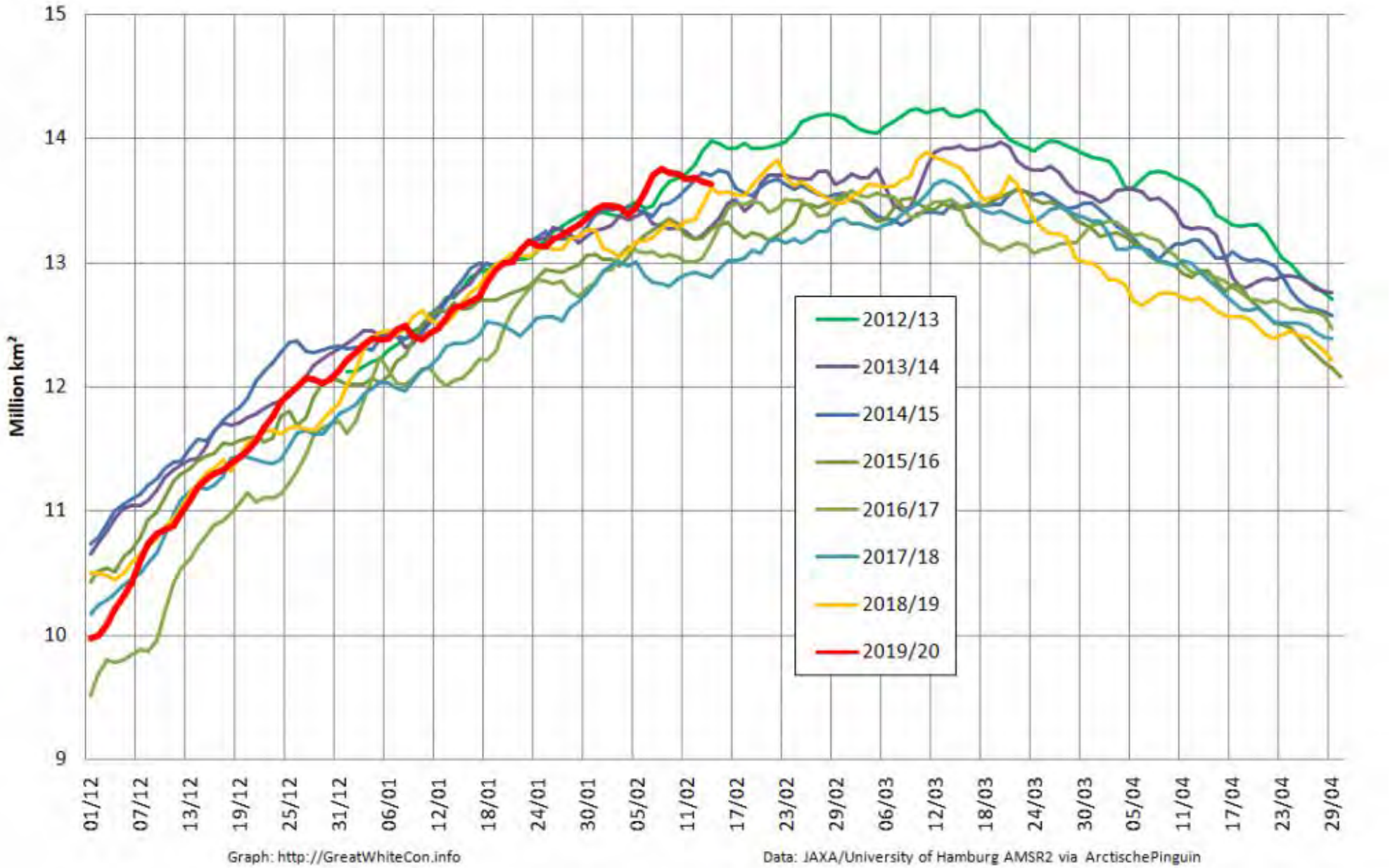
Annual sea ice extent, 1979-present



Carbon Brief


January 2nd Arctic Sea Ice Volume
Danish Meteorological Institute data
2.00E+13
1.90E+13
1.80E+13
1.70E+13
1.60E+13
1.50E+13
Volume (m. cu.)
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

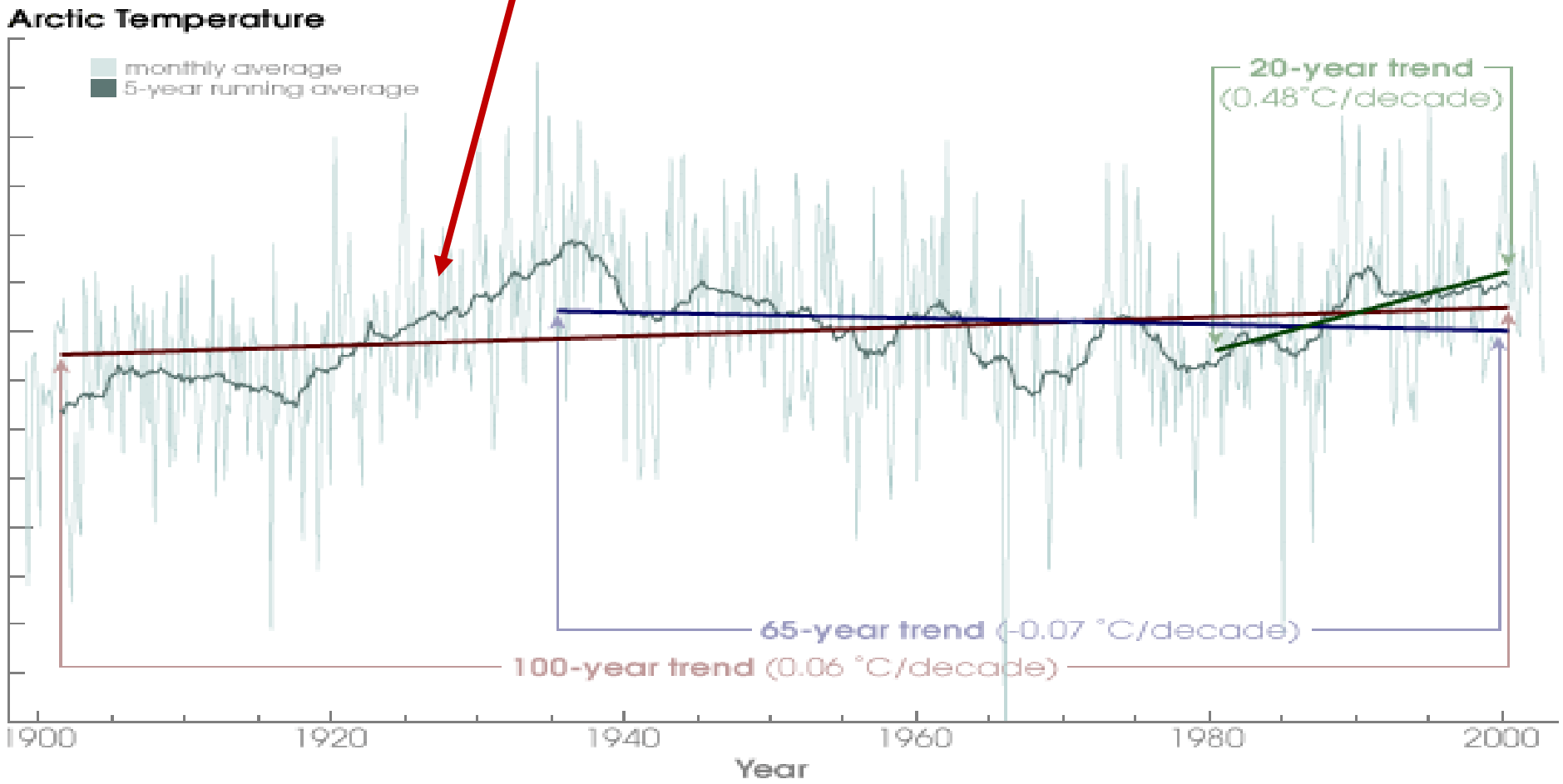
UH AMSR2 Arctic Sea Ice Extent



https://earthobservatory.nasa.gov/features/Arctic Ice/arctic_ice3.php

~1918-1937 at a rate of 0.84C/decade, 75% faster than the 0.48C/decade from 1980-2000.

Notice ~34yr up, ~34 yr down, ~30 yr up
~65-year cycle



“Arctic Ocean Getting Warm; Seals Vanish and Icebergs Melt.”

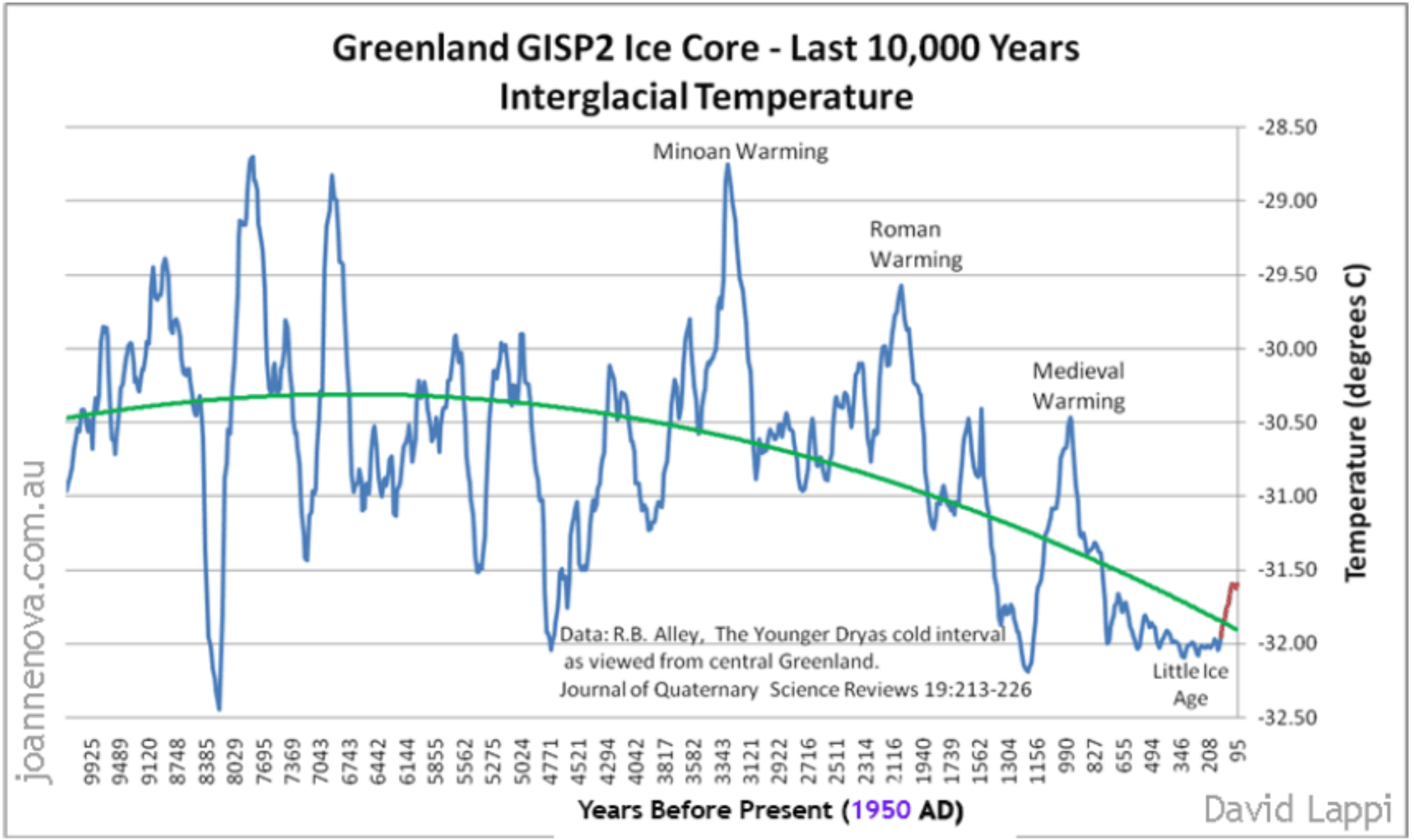
- “The Arctic Ocean is warming up, icebergs are growing scarcer and in some places the seals are finding the water too hot, according to a report to the Commerce Department yesterday from Consul Ifft, at Bergen, Norway.
- “Reports from fishermen, seal hunters and explorers, he declared, all point to a radical change in climate conditions and hitherto unheard-of temperatures in the Arctic zone. Exploration expeditions report that scarcely any ice has been met with as far north as 81 degrees 29 minutes. Soundings to a depth of 3,100 meters showed the gulf stream still very warm.
- The article appeared on page 2 of the *Washington Post* on November 2, 1922.


1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015
30,000 polar bears
25,000
20,000
15,000
5,000
1960 estimate
5000-15,000
Unofficial estimates by the Polar Bear Study Group of polar bear populations, 1960-2017
2017 estimate
28,500 bears


FEE
POLAR BEAR
POPULATION ESTIMATES
1950s 5,000
1965-1970 8,000-10,000
1984 25,000
2005 20,000-25,000
2015 22,000-31,000
Sources: New York Times; Covebear.com; International Bear Association; International Wildlife; IUCN; Polar Bear Study Group.

- **NASA Study: Mass Gains of Antarctic Ice Sheet Greater than Losses**
  - Oct. 30, 2015

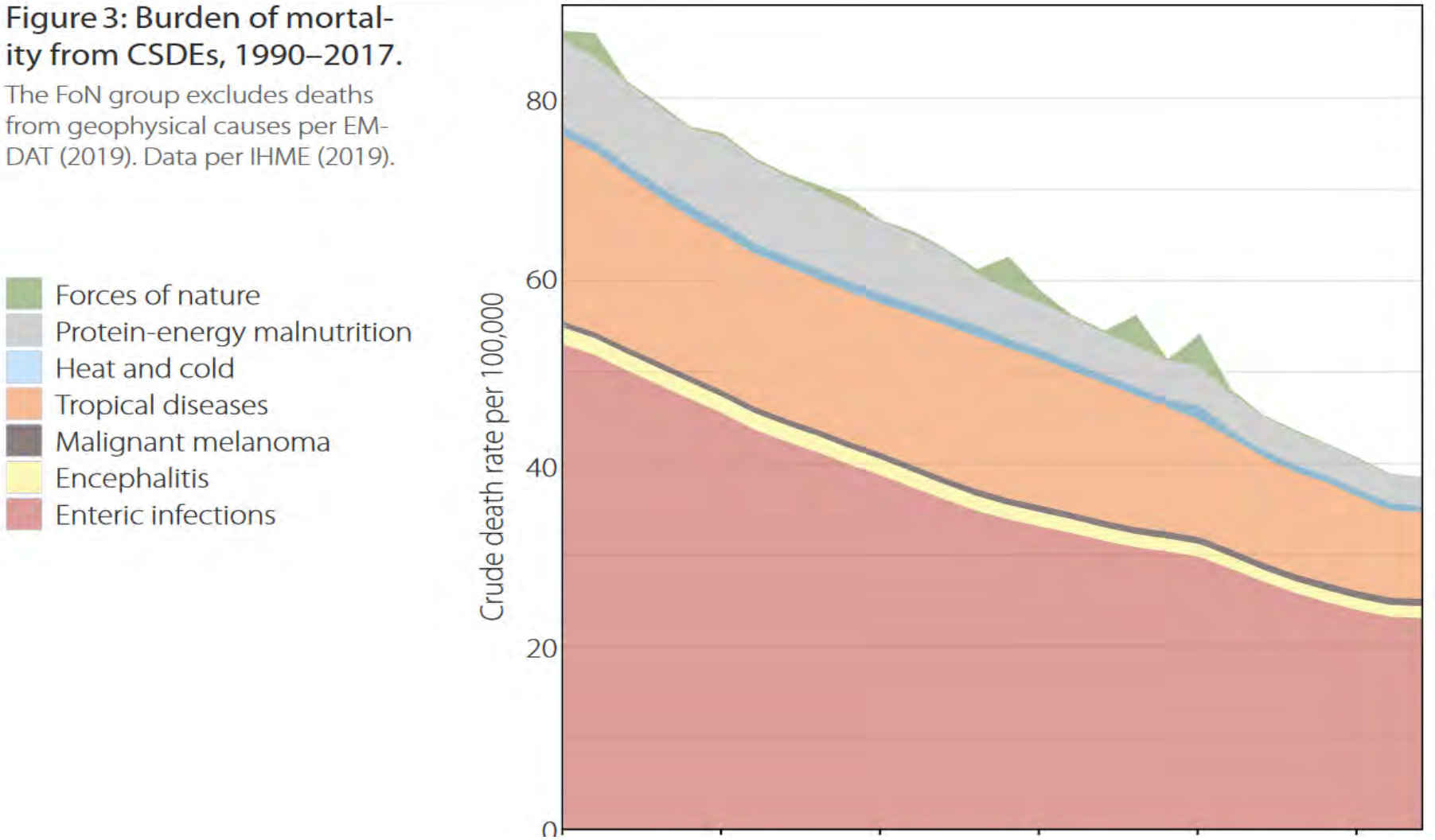

Queen Maud Land
ANTARCTIC PENINSULA
ANTARCTICA
South Pole
WILKES LAND
NEW ZEALAND
KEY
Sites of some of the 91 volcanoes discovered


Greenland GISP2 Ice Core - Last 10,000 Years
Interglacial Temperature
Minoan Warming
Roman Warming
Medieval Warming
Little Ice Age
Data: R.B. Alley, The Younger Dryas cold interval as viewed from central Greenland. Journal of Quaternary Science Reviews 19:213-226
-28.50
-29.00
-29.50
-30.00
-30.50
-31.00
-31.50
-32.00
-32.50
Temperature (degrees C)
9925 9489 9120 8748 8385 8029 7695 7369 7043 6743 6442 6144 5855 5562 5275 5024 4771 4521 4294 4042 3817 3582 3343 3121 2922 2716 2511 2314 2116 1940 1739 1562 1304 1156 990 827 655 494 346 208 95
Years Before Present (1950 AD)
joannenova.com.au
David Lappi

Climate-Sensitive Diseases and Events

Figure 3: Burden of mortality from CSDEs, 1990–2017.

The FoN group excludes deaths from geophysical causes per EM-DAT (2019). Data per IHME (2019).

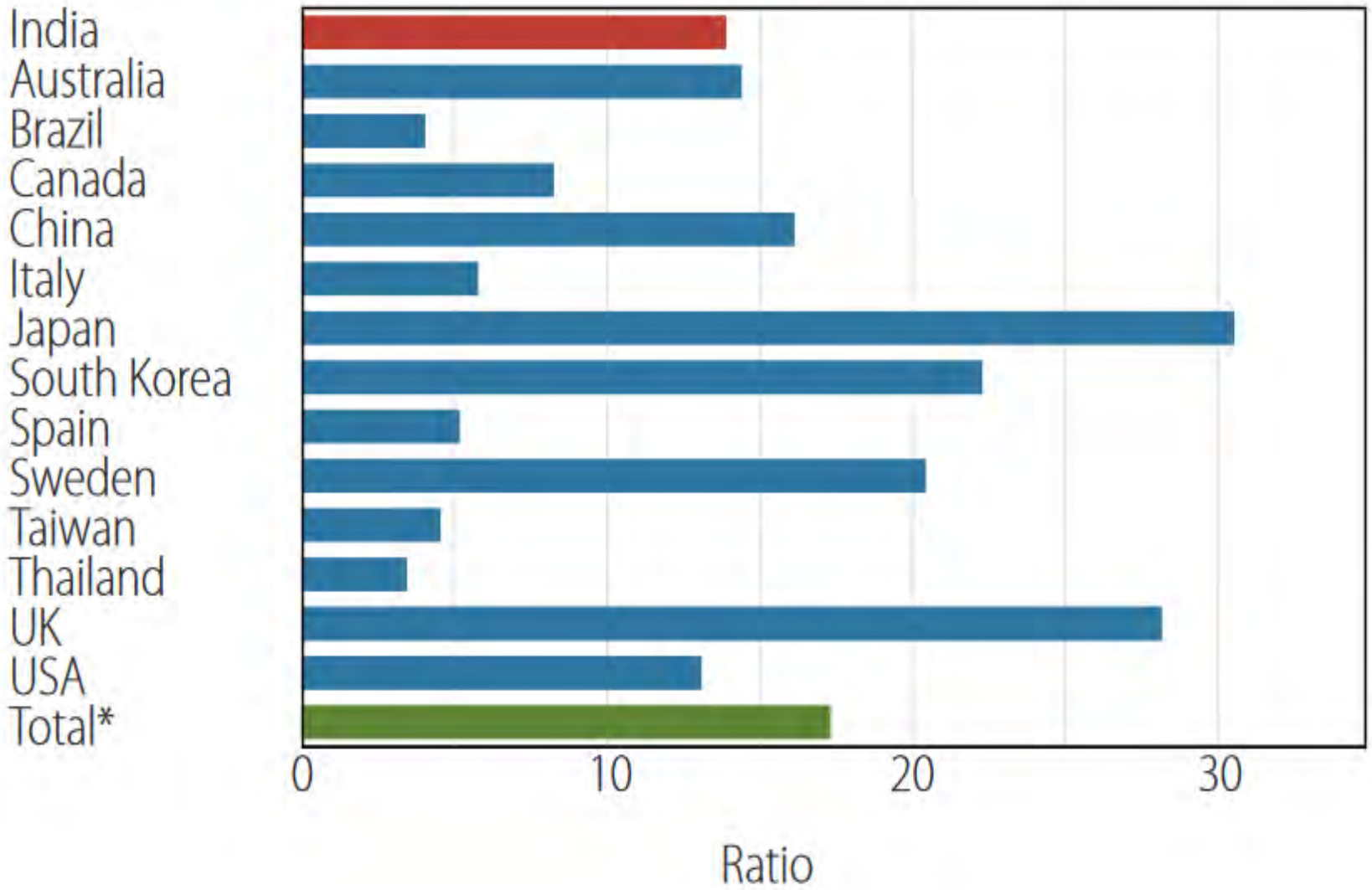


Full Report: *The Lancet Countdown on Climate Change: The need for context* (pdf)

Indur Goklany is an independent scholar and author. He was a member of the US delegation that established the Intergovernmental Panel on Climate Change (IPCC) and helped develop its First Assessment Report. He subsequently served as a US delegate to the IPCC, and an IPCC reviewer.

Figure 17: Ratio of deaths attributable to colder-than-optimum versus those attributable to warmer-than-optimum temperatures.

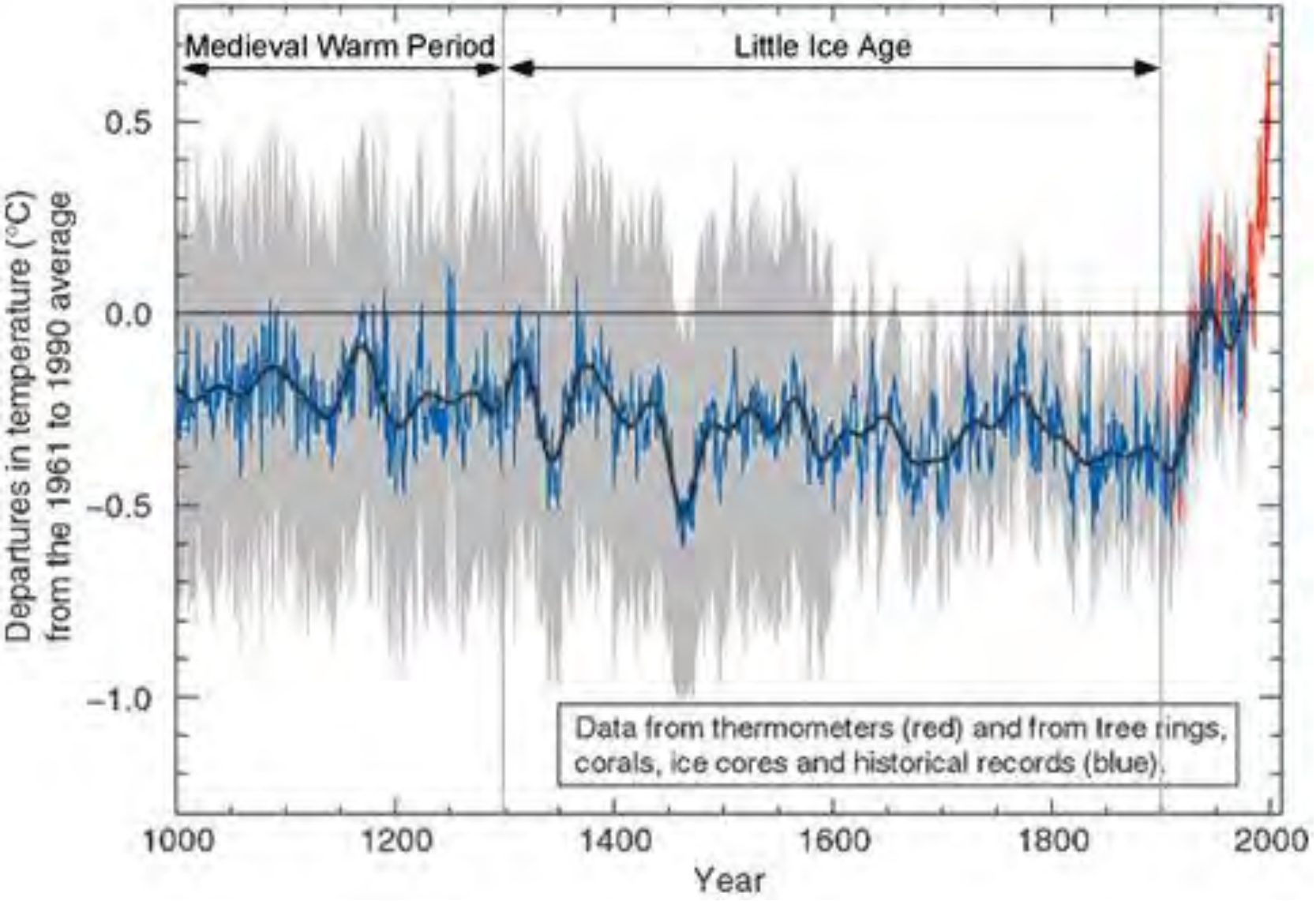
The blue and black ('Total') bars are from Gasparrini et al. (2015); the red from Fu et al. (2018). *The Total bar is based on the aggregate deaths for countries in blue.



Cyclic and Historical Data

Mann’s Hockey Stick, The Medieval Warm Period (MWP), and the Little Ice Age (LIA)

The Hockey Stick (1999)



Mann et al. (1998), on the basis of a single tree-ring study, concluded that neither the MWP nor the Little Ice Age actually happened and that assertion became the official position of the 2001 Intergovernmental Panel on Climate Change (IPCC).

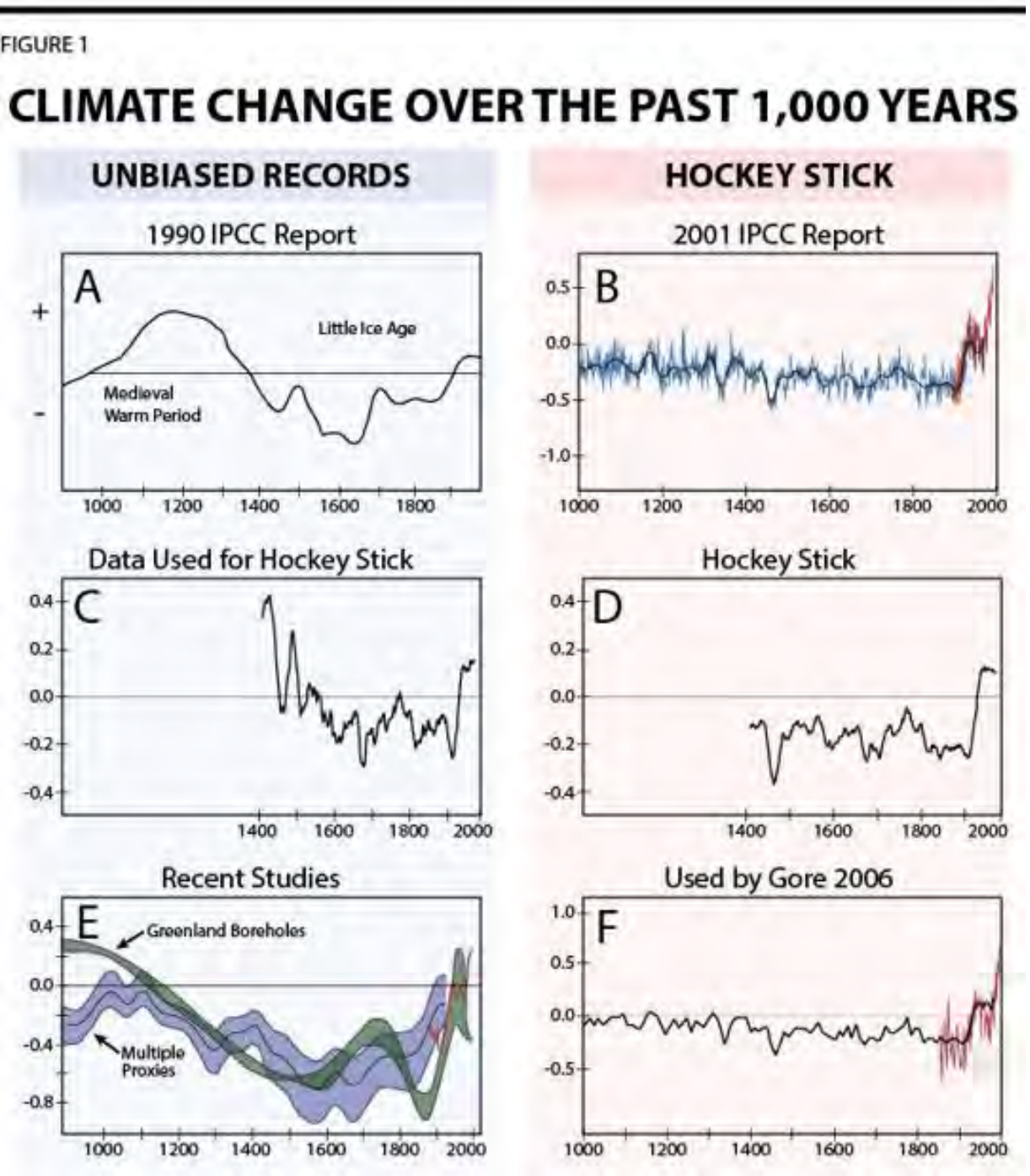
Mann's Hockey Stick

- **Global Warming Bombshell**

  "A prime piece of evidence linking human activity to climate change turns out to be an artifact of poor mathematics."

  MIT Technology Review, October 15, 2004

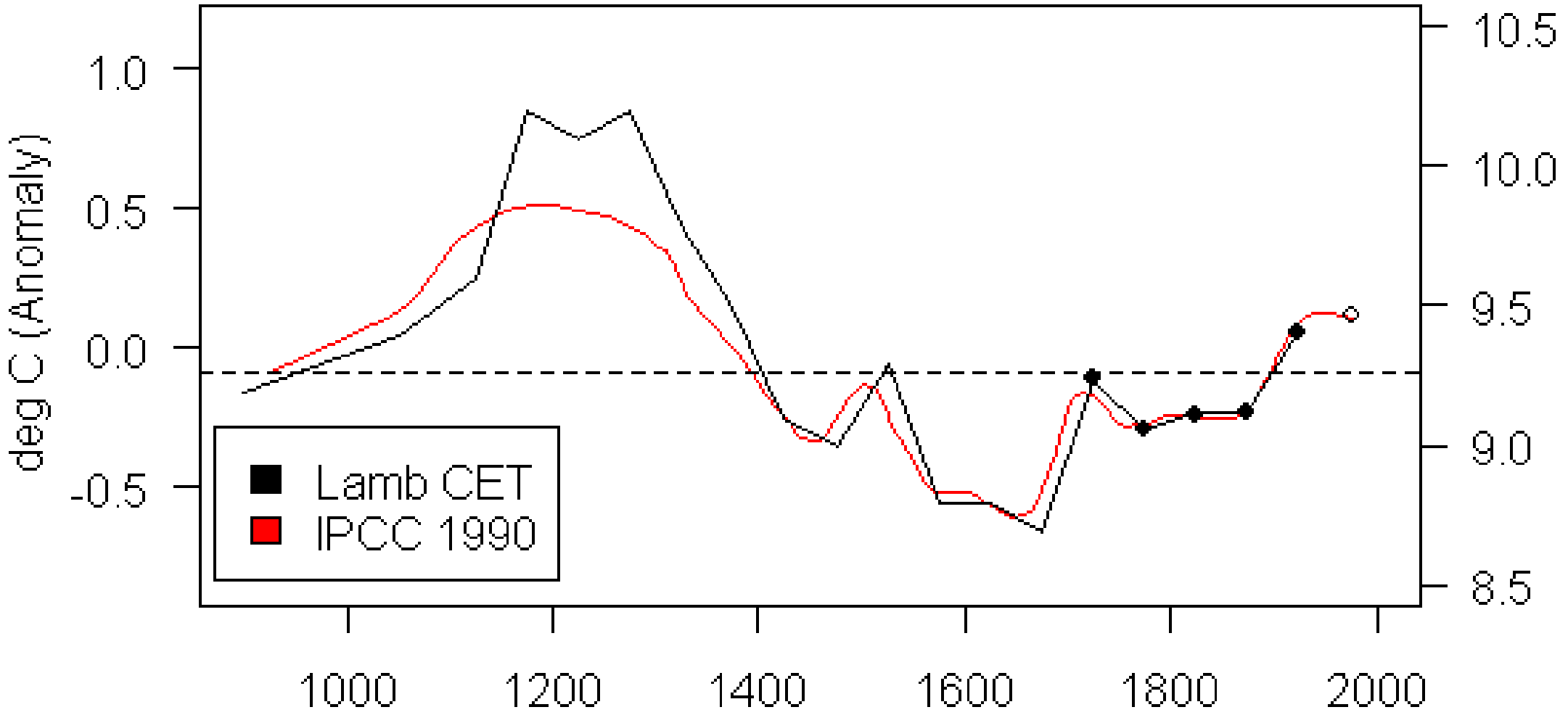
- McIntyre and McKitrick created some meaningless test data that had, on average, no trends. This method of generating random data is called Monte Carlo analysis, after the famous casino, and it is widely used in statistical analysis to test procedures. When McIntyre and McKitrick fed these **random data into** the Mann procedure, **out popped a hockey stick** shape!



A: featured in the 1990 IPCC report, on the first few pages of Chapter 7, “Observed Climate Variations and Change” as the schematic representation of climate change over the past 1,000 years (page 202). B: 2001 IPCC report. C and D: “Corrections to the Mass et al. (1998) Proxy Data Base and Northern Hemisphere Average Temperature Series,” McIntyre and McKitrick, Energy and Environment, 2003. E: “Cosmic Rays and Climate,” by Jasper Kirkby, Surveys in Geophysics 28, 333–375. F: An Inconvenient Truth.

IPCC 1990, Lamb Central England Temp

50 yr averages, Dots from Hadley 50 yr avg



The MWP and LIA

- The warmists have been trying to “disappear” the Medieval Warm Period or relegate it to Europe-only as it demonstrates against AGW global disaster
- There was no significant CO_2 or man-made CO_2 in the MWP
- History and science agree that there was a global MWP
  - Greenland
  - Viniculture in England
  - Sea bed temperature proxies

The Little Ice Age

- The “current warming trend” is presented starting from the coldest point in the Little Ice Age
  - NY harbor freezes over
  - Thames freezes
  - “Hans Brinker & the Silver Skates”
  - Greenland abandoned
  - Ikaite from Greenland and Antarctica
- From the top of the MWP, we are still cooling

Sea Core Sampling Results Highlights

- **These data clearly indicated there was a period of time in the early part of the past millennium when the climate in the area of the southwestern Baltic Sea was significantly warmer than it is today.**
- **The data of Esper et al. (2002) show, in their words, that the warmest portion of the Medieval Warm Period "covers the interval 950-1045, with the peak occurring around 990."**

- **Newton et al. stated that their data from the Makassar Strait of Indonesia clearly indicated that "climate changes during the Medieval Warm Period and Little Ice Age were not confined to the high latitudes" nor to countries bordering the North Atlantic Ocean.**
- **The warmth of the more distant past clearly exceeded that of the recent past, with the peak temperature of the MWP exceeding that of the Current Warm Period by about 0.6°C, as best as can be determined from the graphical representation of Ran et al.'s data.**
- **Evidence of the Medieval Warm Period exists in Australia, New Zealand and Oceania**

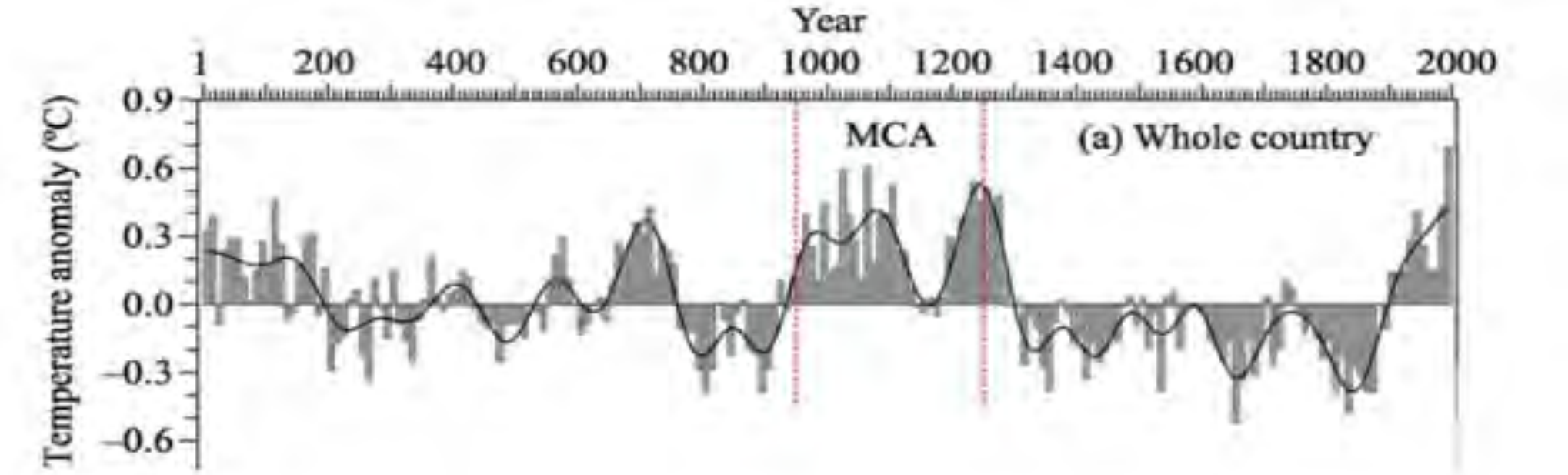
MWP was Global - 2012

- Research from Syracuse University has established another metric for analyzing historical climate conditions — a rare mineral called ikaite.
- During warming and cooling periods oxygen-16 and oxygen-18, respectively, accumulate in the water and by studying these levels trapped in the crystals [of ikaite] researchers can approximate climate conditions.
- The Syracuse researchers found a direct correlation between a rise and fall in oxygen-18 isotopes in ikaite in both **Greenland and Antarctica** for a period known as the Medieval Warming Period, which was followed by a “little ice age.”
- The Medieval Warming Period to some in the scientific community is held to be an isolated event in Europe and Greenland but this correlation may show it was global.

Chinese Scientists: It Was Warmer In China During Medieval Warm Period Than Today

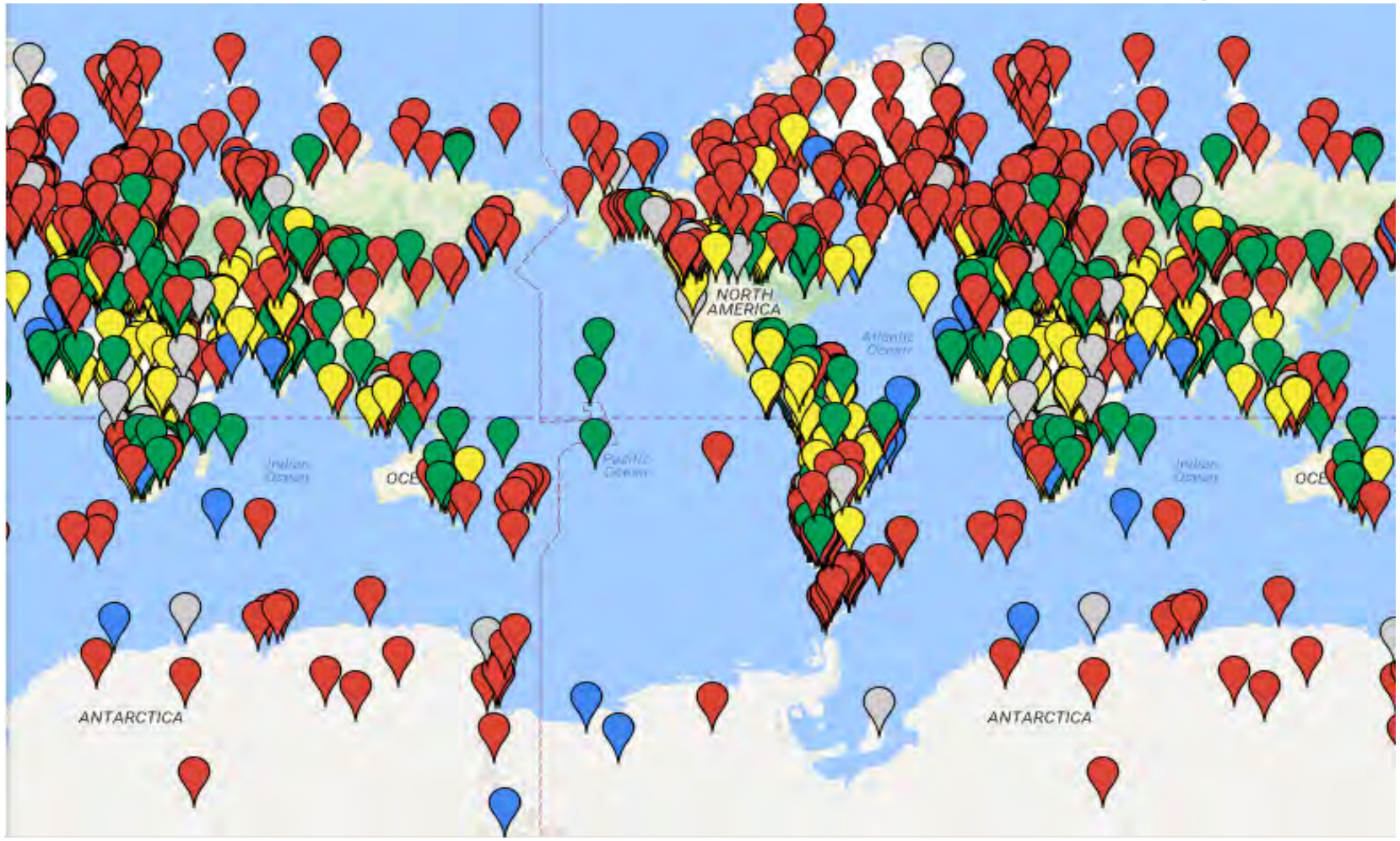
•Zhixin Hao, Maowei Wu, Yang Liu, Xuezhen Zhang & Jingyun Zheng, Journal of Geographical Sciences, January 2020

'For China as a whole, the longest warm period during the last 2000 years occurred in the 10th–13th centuries'

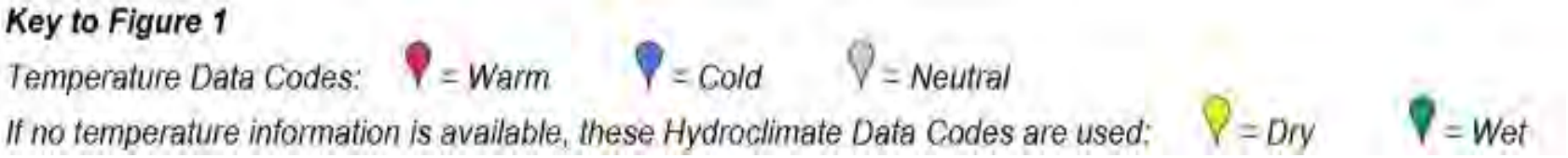


Source: **Hao et al., (2020**

Evidence that the Medieval Warming Period was global



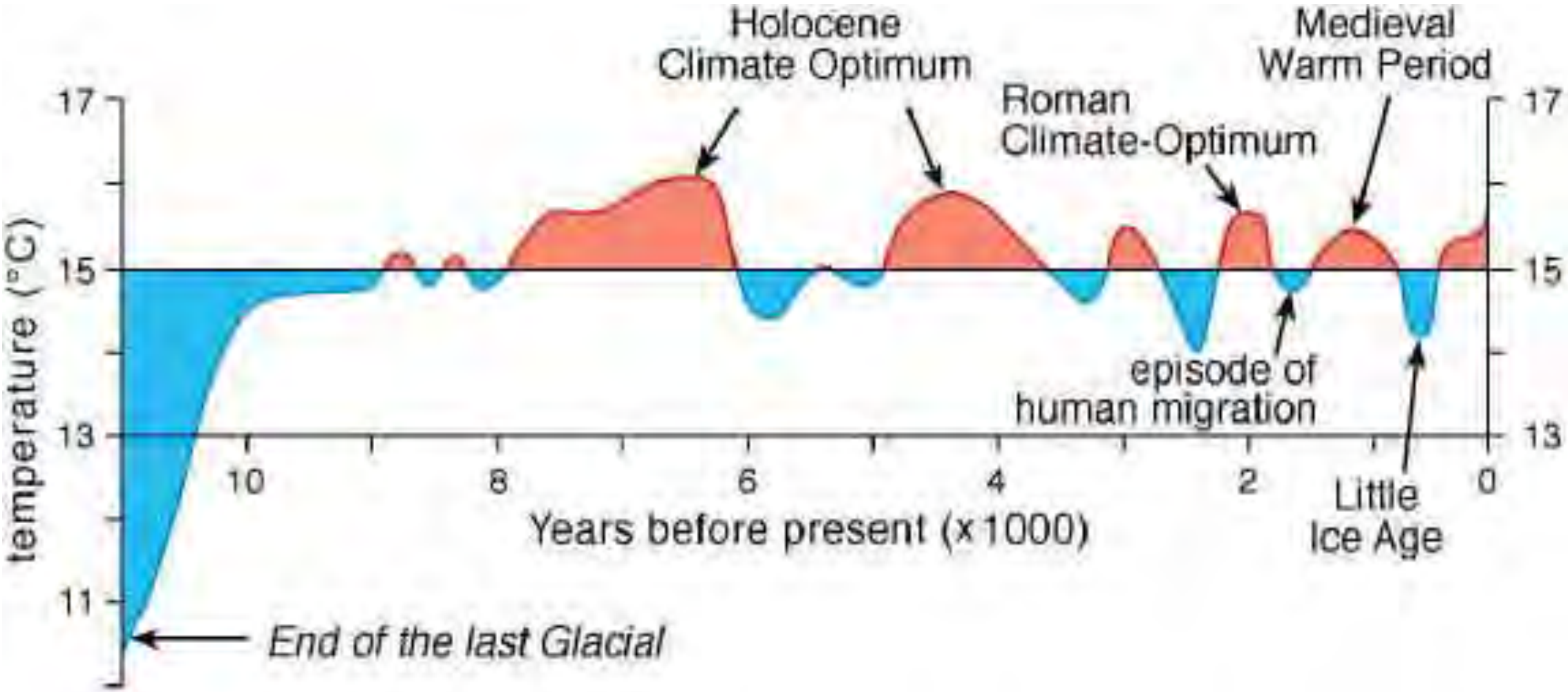
Climate reconstructions of the 'Medieval Warm Period' 1000-1200 AD.



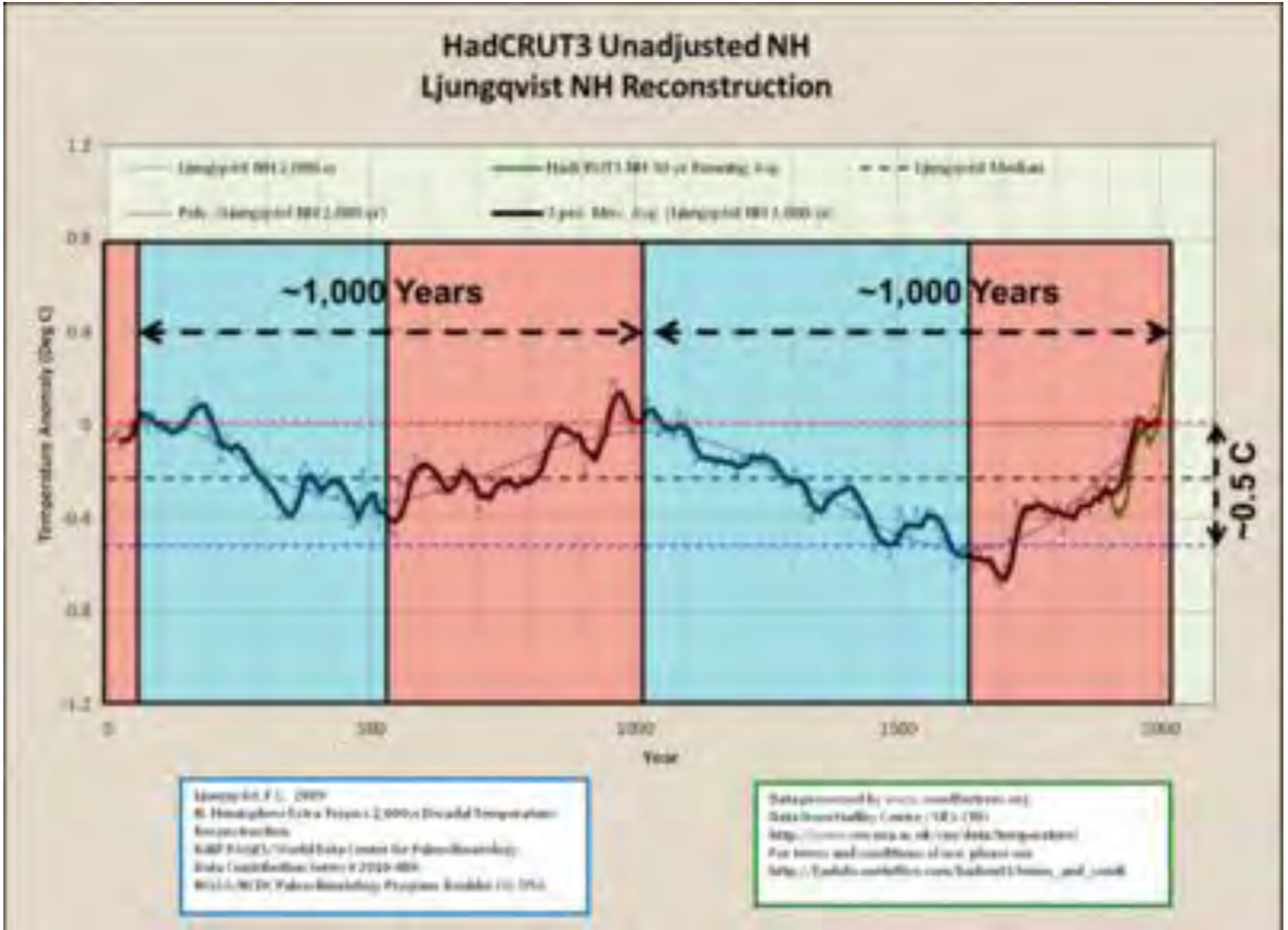
More evidence that the Medieval Warming Period was global, not regional

Anthony Watts / February 12, 2018

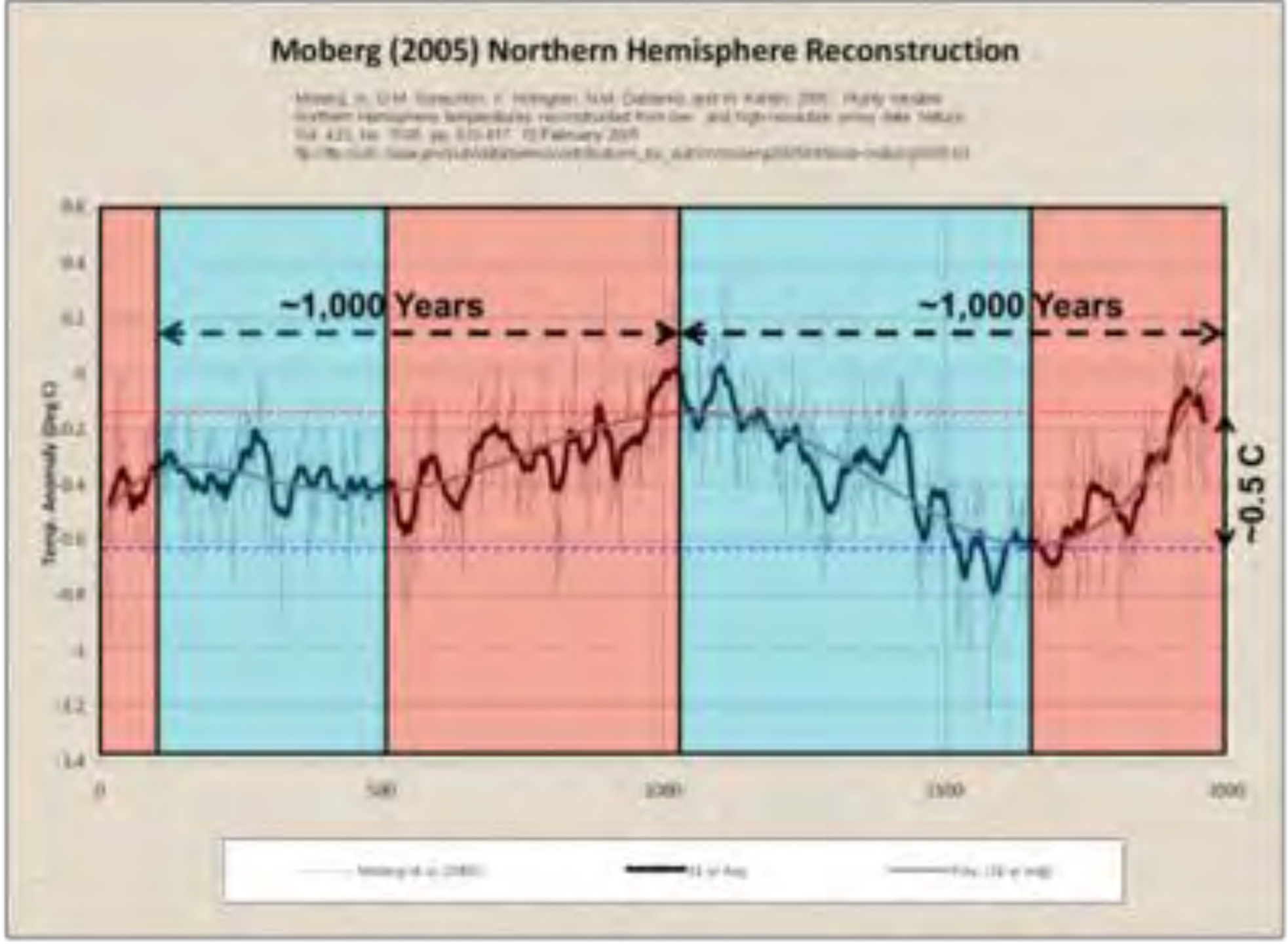
- **New paleoclimate records from Europe, Scandinavia-Russia, China, and the northeastern USA indicate there has been no unusual modern warming. Instead, these newly published reconstructions show warmer periods and more rapid centennial-scale warming events occurred in past centuries, or when CO2 concentrations were much lower than they are now.**
- **None of these Northern Hemisphere temperature reconstructions indicate there has been any unusual modern warming relative to the natural temperature variations of the last few millennia.**
- **Warmists still deny that the MWP was global or warmer than now**



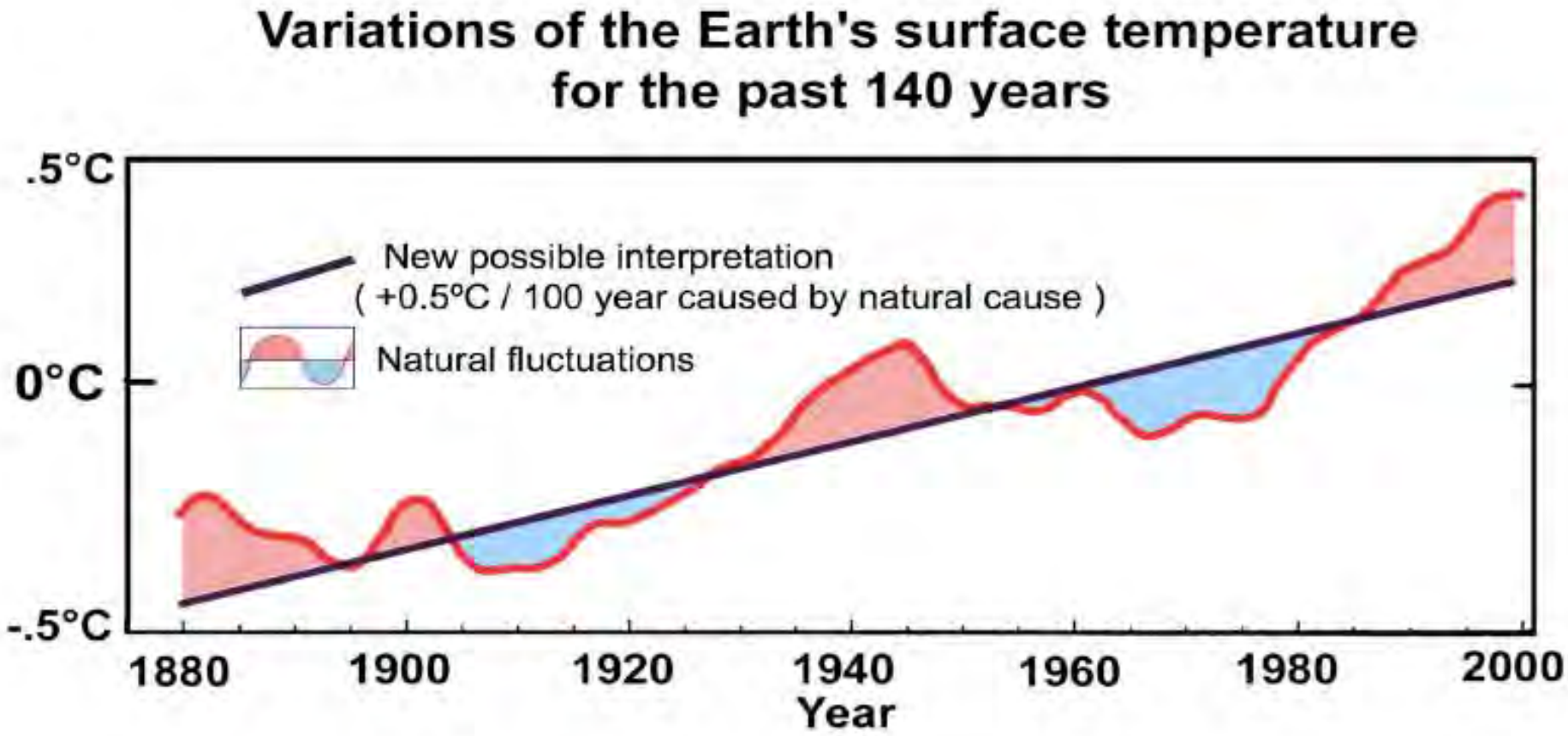
Average near-surface temperatures of the northern hemispere during the past 11.000 years (after Dansgaard et al., 1969, and Schönwiese, 1995)


HadCRUT3 Unadjusted NH
Ljungqvist NH Reconstruction
~1,000 Years
~1,000 Years
~0.5 C
Temperature Anomaly (Deg C)
Year

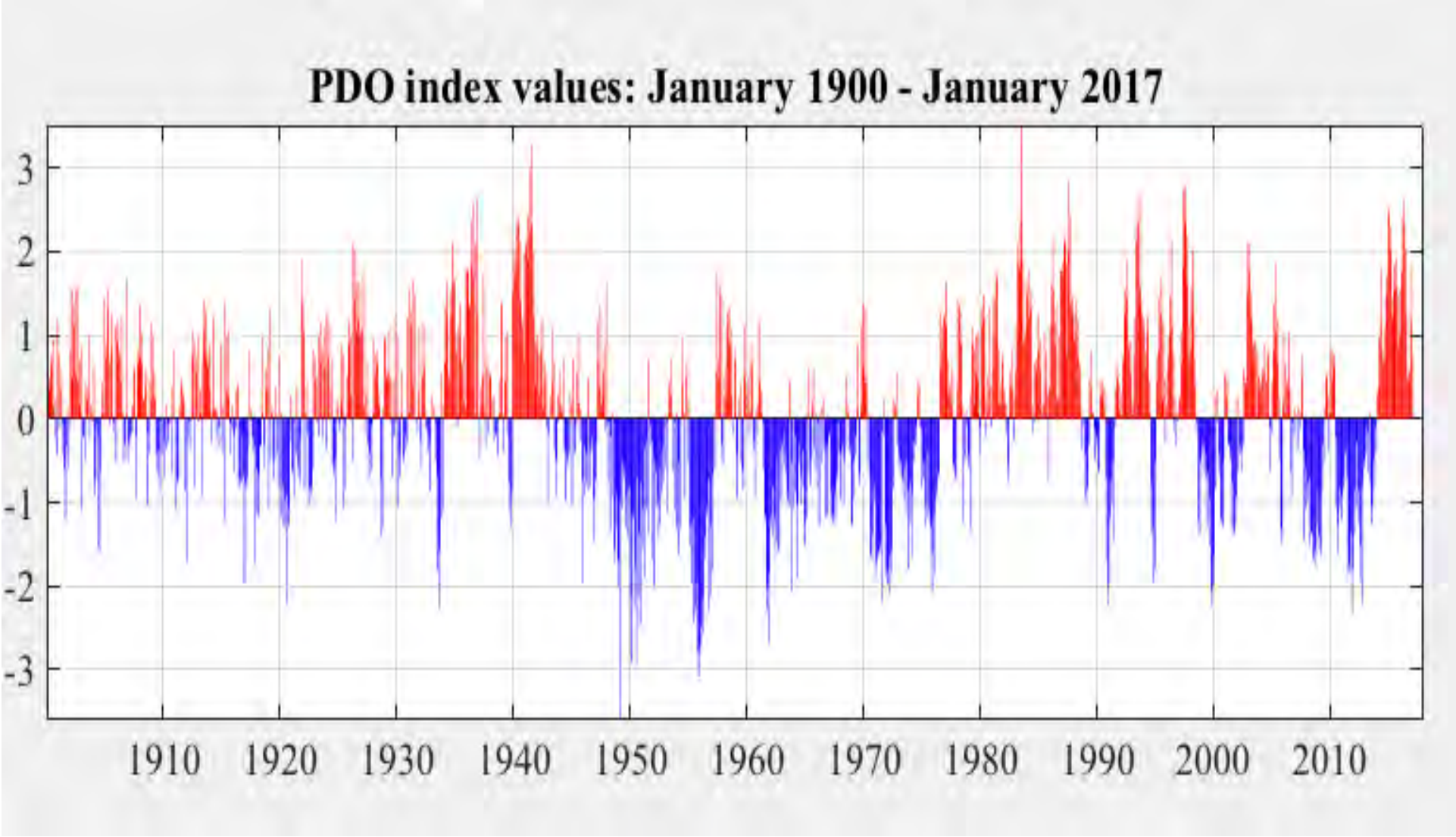
Moberg (2005) Northern Hemisphere Reconstruction

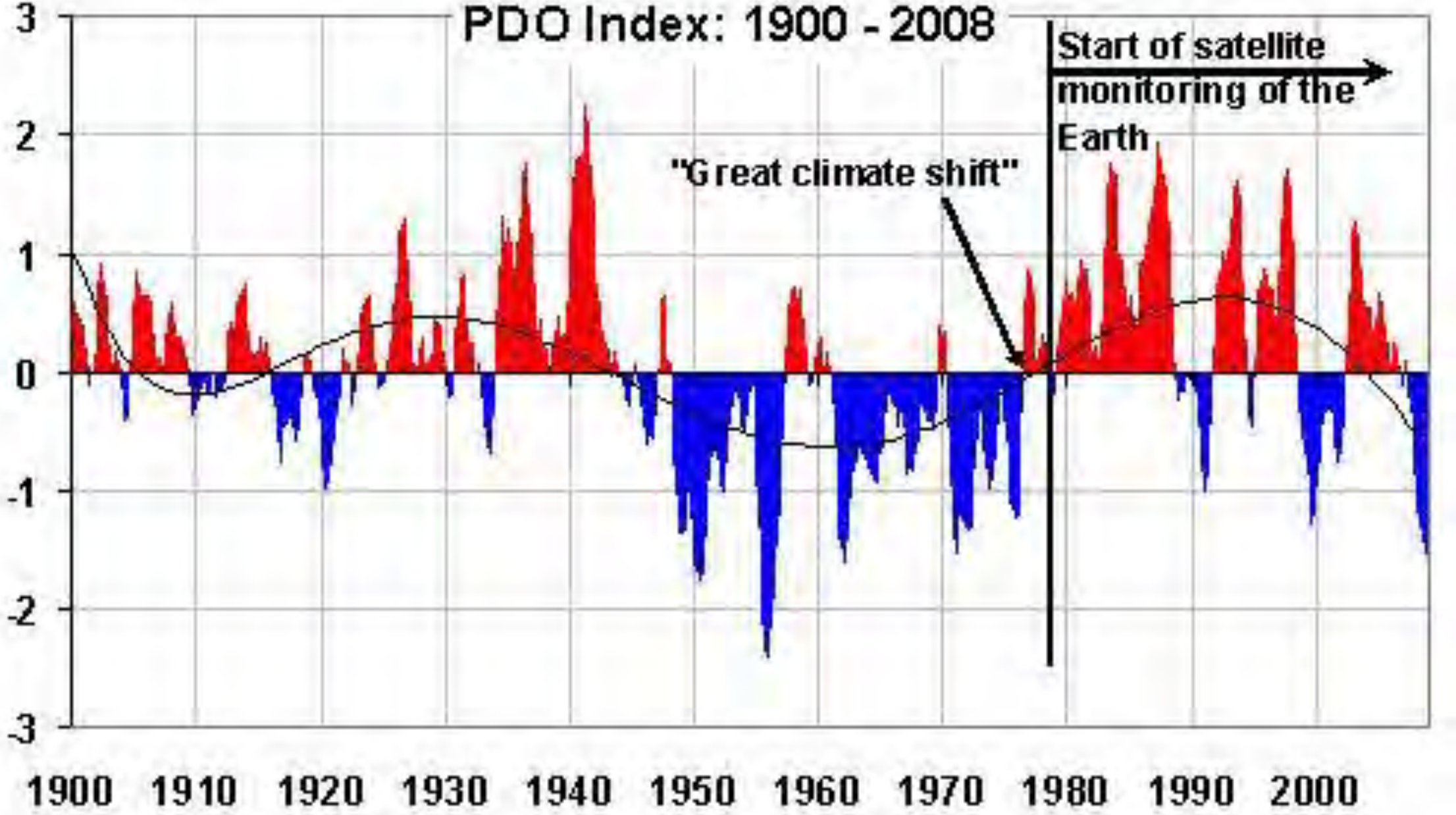


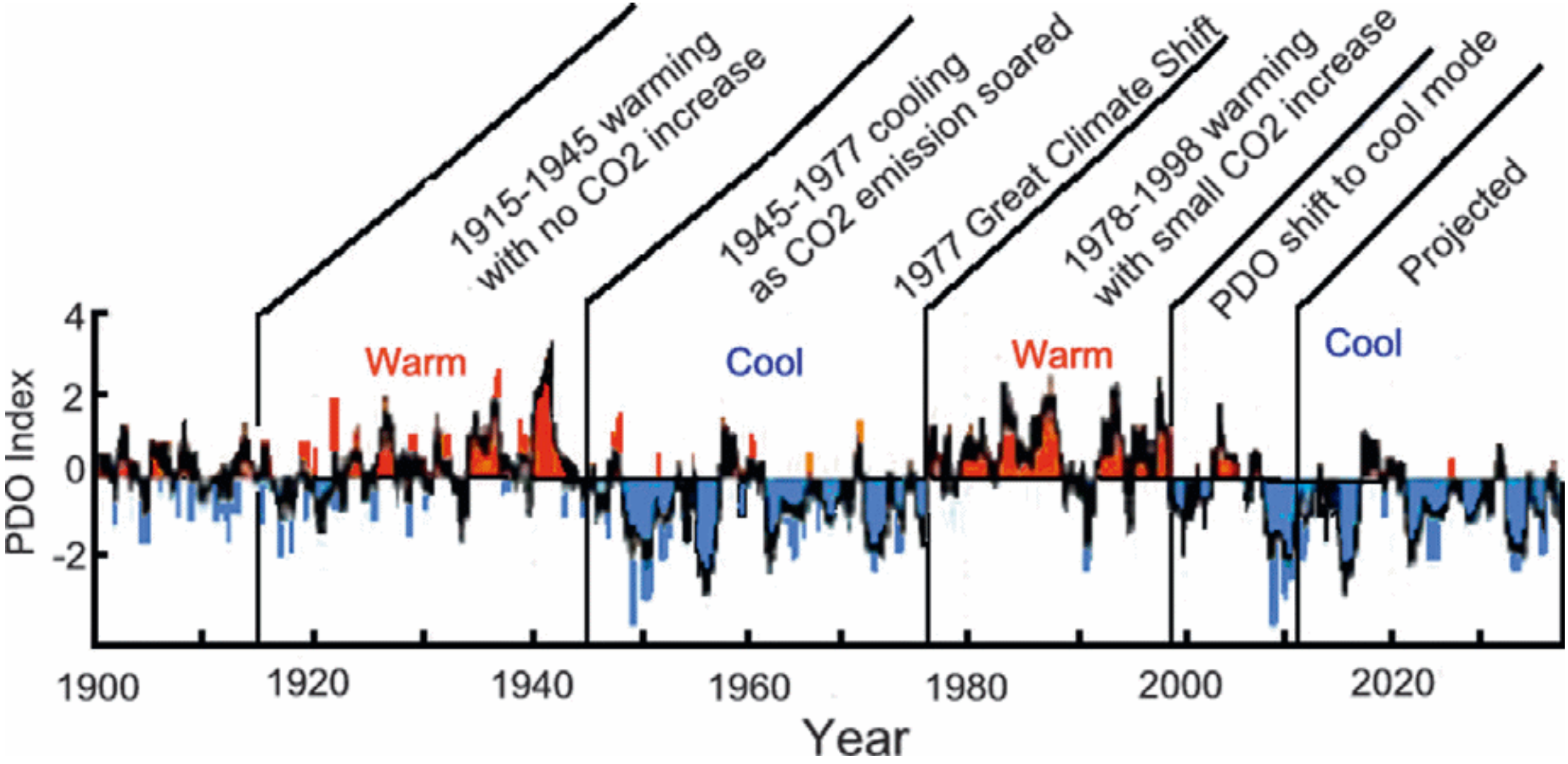
There are Short Cycles as well as Long Cycles


Variations of the Earth's surface temperature
for the past 140 years
.5°C
0°C
-.5°C
New possible interpretation
(+0.5°C / 100 year caused by natural cause)
Natural fluctuations
1880
1900
1920
1940
1960
1980
2000
Year

The Pacific Decadal Oscillation (PDO)




PDO Index: 1900 - 2008
Start of satellite monitoring of the Earth
"Great climate shift"
3
2
1
0
-1
-2
-3
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000


1915-1945 warming
with no CO2 increase
1945-1977 cooling
as CO2 emission soared
1977 Great Climate Shift
1978-1998 warming
with small CO2 increase
PDO shift to cool mode
Projected
Warm
Cool
Warm
Cool
PDO Index
4
2
0
-2
1900
1920
1940
1960
1980
2000
2020
Year

Great Climate Shift

- **“The surge in global temperatures since 1977 can be attributed to a 1976 climate shift in the Pacific Ocean that made warming El Niño conditions more likely than they were over the previous 30 years and cooling La Niña conditions less likely”** says corresponding author de Freitas.
- **“We have shown that internal global climate-system variability accounts for at least 80% of the observed global climate variation over the past half-century.**

- **Like the El Nino and La Nina oscillation of the tropical Pacific (also called the El Nino – Southern Oscillation, or ENSO), the PDO represents two different average circulation states that the ocean-atmosphere system seems to have a difficult time choosing between.**
- **But whereas ENSO changes every few years, the PDO changes every thirty years or so. This long time scale makes the PDO a potential key player in climate change.**

Harmonic Analysis of Worldwide Temperature Proxies for 2000 Years

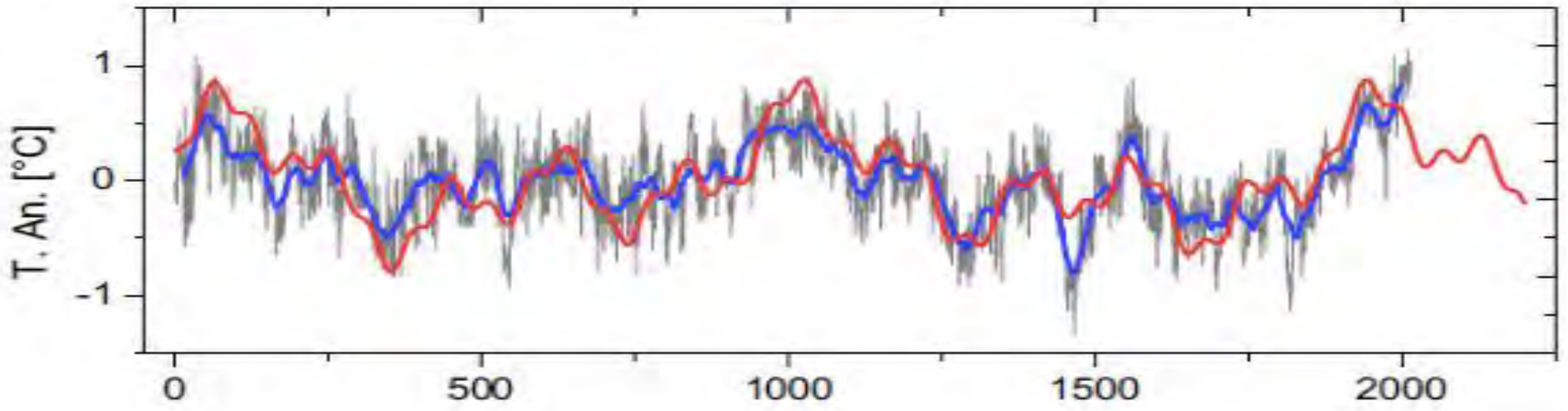
- Fourier analysis represents any time series of data as weighted components of sinusoids of frequencies in the time domain

- The Fourier spectrum of G7 (a temperature history reconstruction) shows the strongest components as ~1000-, ~460-, and ~190 - year periods whereas other cycles of the individual proxies are considerably weaker.

- Confirmed the solar origin of the most prominent ~190 year cycle over 10,000 years with new accuracy.

- The G7 temperature extrema coincide with the Roman, medieval, and present optima as well as the well-known minimum of AD 1450 during the Little Ice Age.

Fourier Analysis of 2000 yr T (G7)



Year AD

Gray = G7 temperature proxies and recent instrumental measurements
Blue = 31-year running mean of the G7 data
Red = Sum of four most important sine components extended to 2200

Pearson correlation coefficient of 0.86 to the 31-year running average

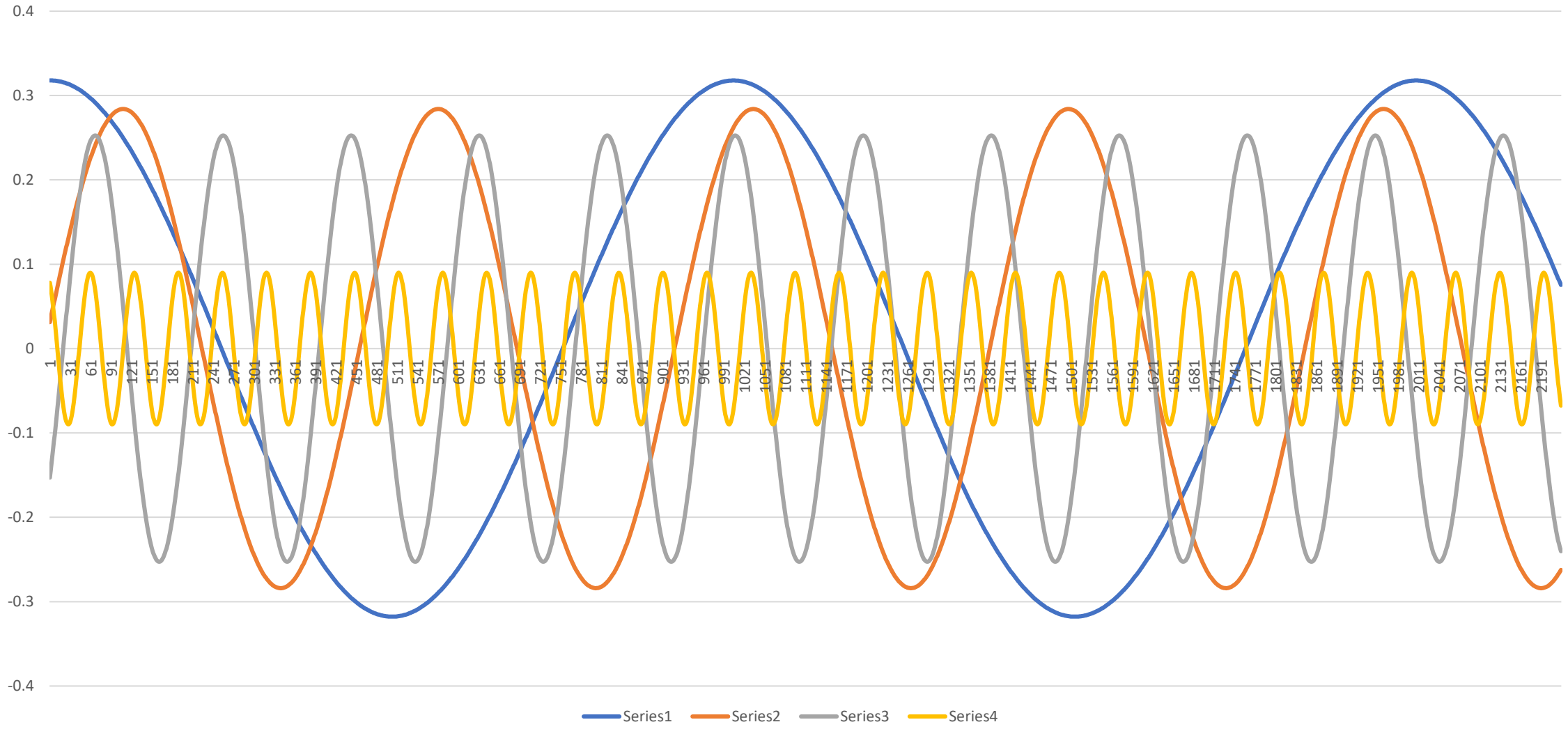
- The Fourier spectrum of a global temperature record G7, composed of high quality temperature proxies worldwide and recent instrumental data demonstrate the dominance of three climate cycles with ~1000 (Eddy cycle), ~460 (not named but frequently reported), and ~190 year periods (De Vries/Suess solar cycle).
- These three sines represent the 31-year running mean of G7 with the remarkable Pearson correlation of 0.84 indicating their importance for climate.
- Adding the fourth sine raises the correlation to 0.86

Period, Amplitude & Phase

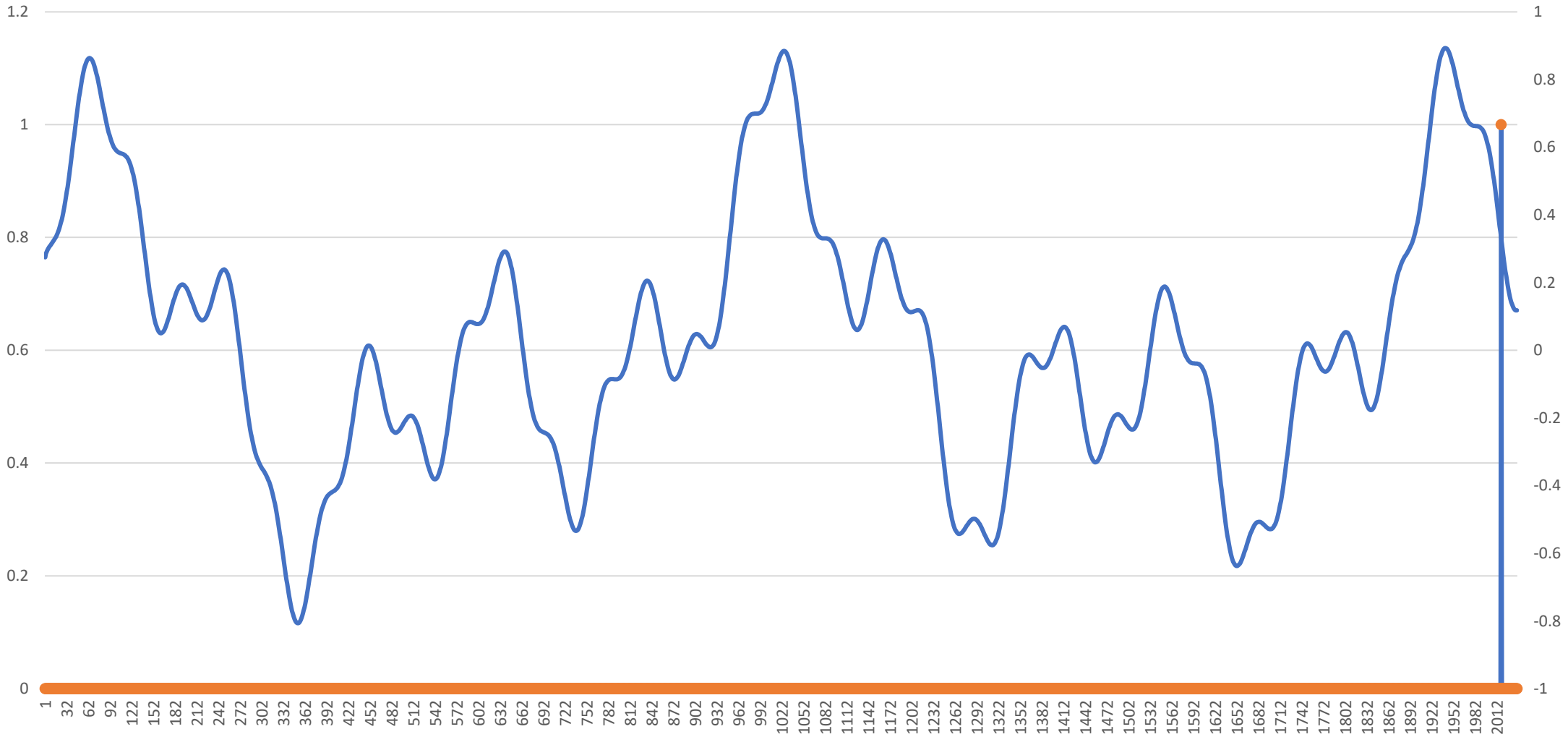
4 largest components

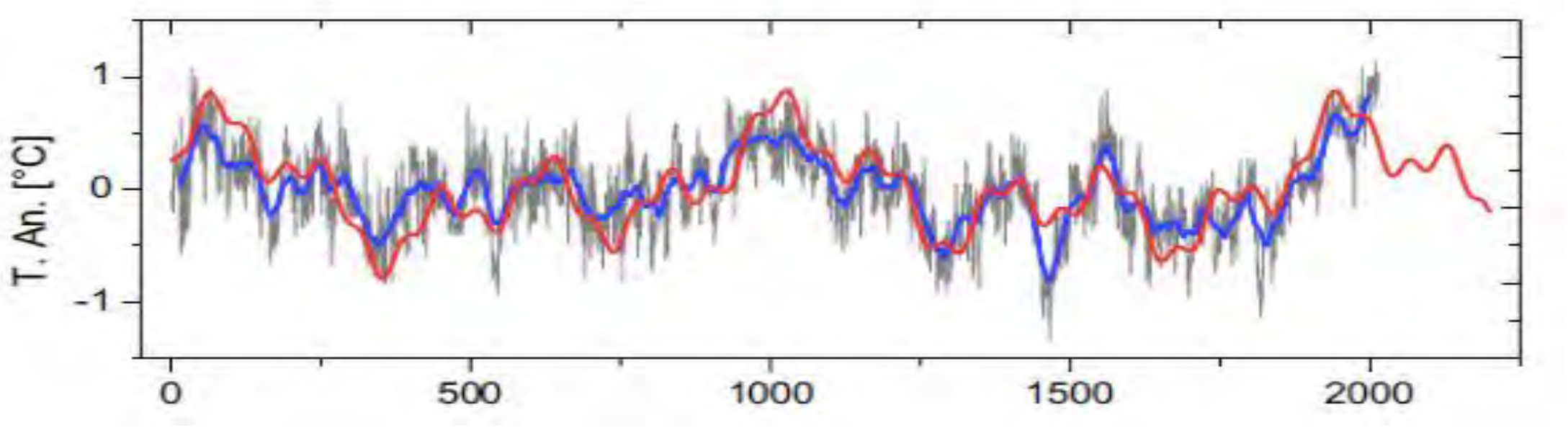
p = 1/f [yr]	A	ϕ
1002.7	0.3178	1.557
462.8	0.284	0.097
188	0.2527	5.599
64.7	0.0899	1.99

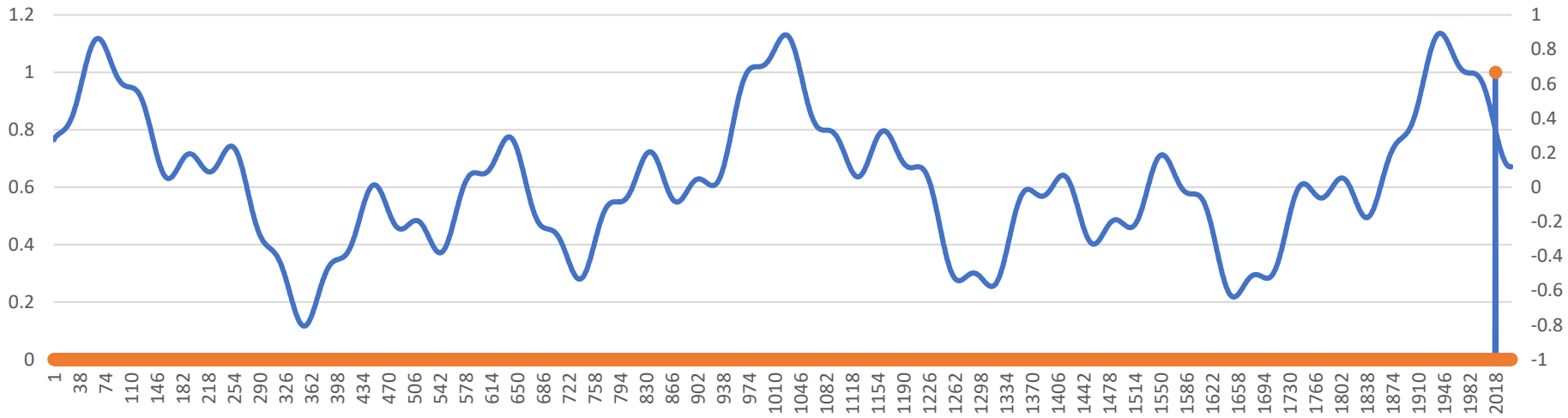
Four Largest Components created in Excel



Sum of First 4 Components




T, An. [°C]
1
0
-1
0
500
1000
1500
2000

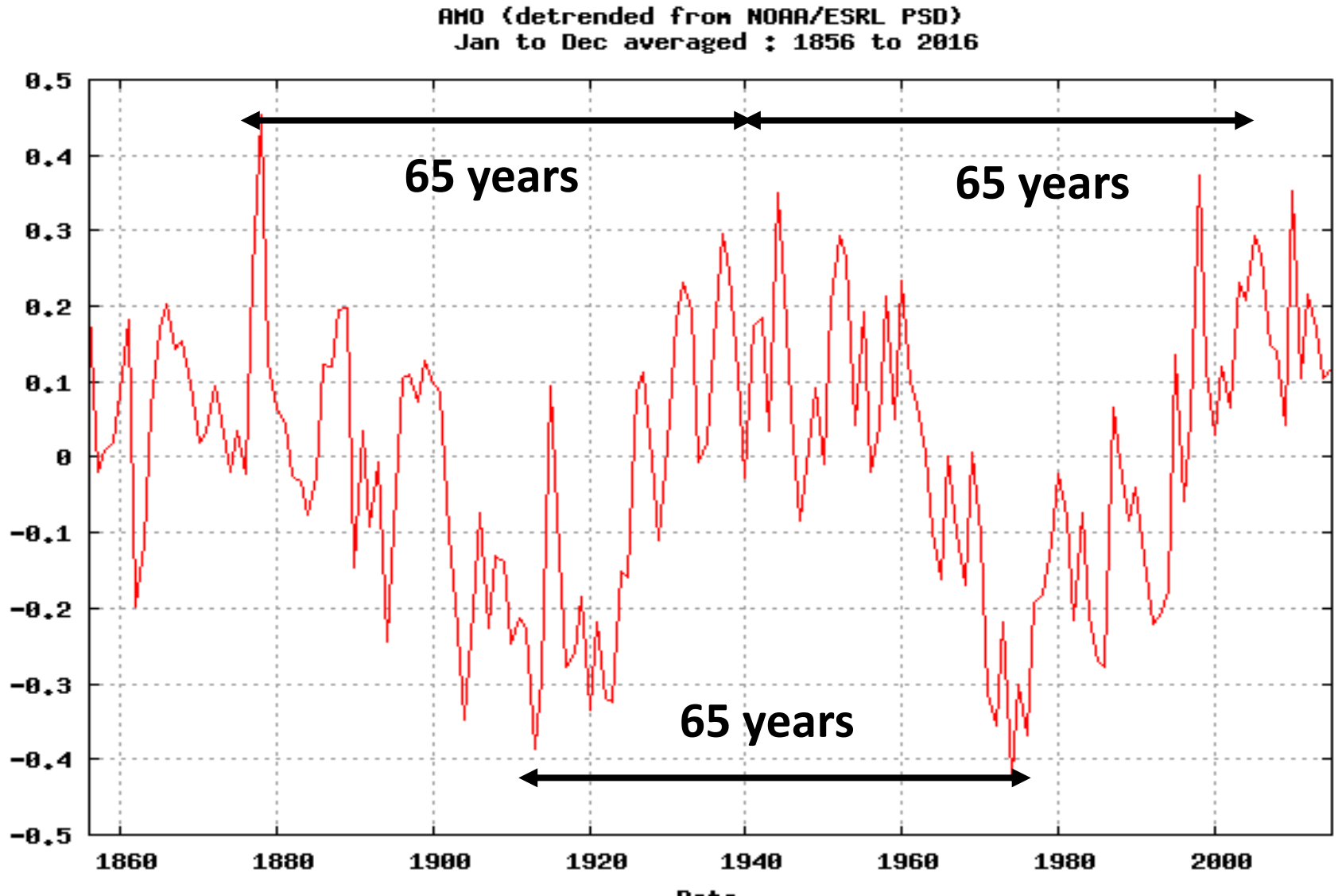

1.2
1
0.8
0.6
0.4
0.2
0
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
1
38
74
110
146
182
218
254
290
326
362
398
434
470
506
542
578
614
650
686
722
758
794
830
866
902
938
974
1010
1046
1082
1118
1154
1190
1226
1262
1298
1334
1370
1406
1442
1478
1514
1550
1586
1622
1658
1694
1730
1766
1802
1838
1874
1910
1946
1982
2018

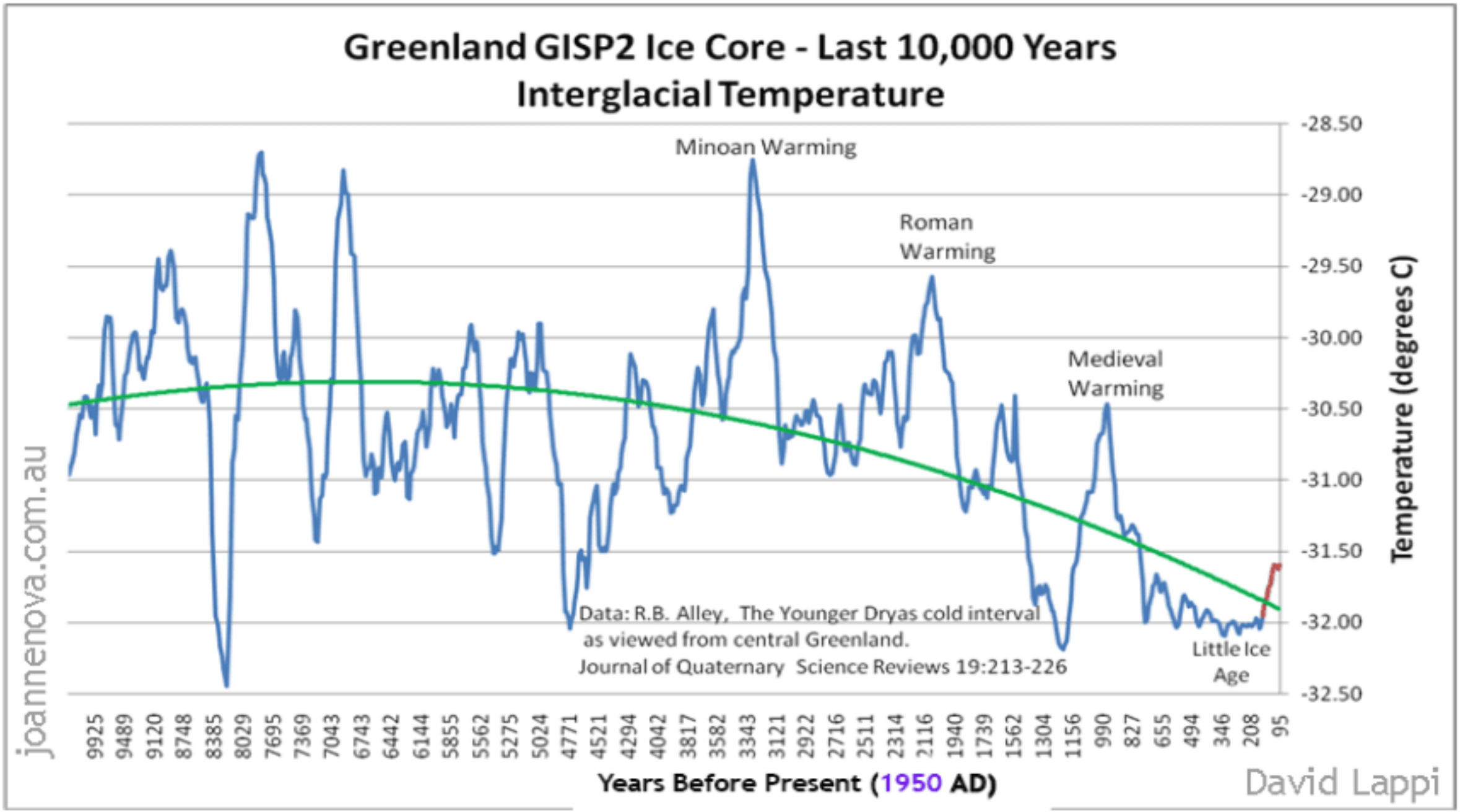
Result of Fourier Analysis

- It can be expected that the periodicity of G7, lasting 2000 years so far, will persist also for the foreseeable future.

- It predicts a temperature drop from present to AD 2050, a slight rise from 2050 to 2130, and a further drop from AD 2130 to 2200. --Horst-Joachim Lüdecke and Carl-Otto Weiss, *The Open Atmospheric Science Journal* (11) 2017.

Atlantic Multidecadal Oscillation




Greenland GISP2 Ice Core - Last 10,000 Years
Interglacial Temperature
Minoan Warming
Roman Warming
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Data: R.B. Alley, The Younger Dryas cold interval as viewed from central Greenland. Journal of Quaternary Science Reviews 19:213-226
-28.50
-29.00
-29.50
-30.00
-30.50
-31.00
-31.50
-32.00
-32.50
Temperature (degrees C)
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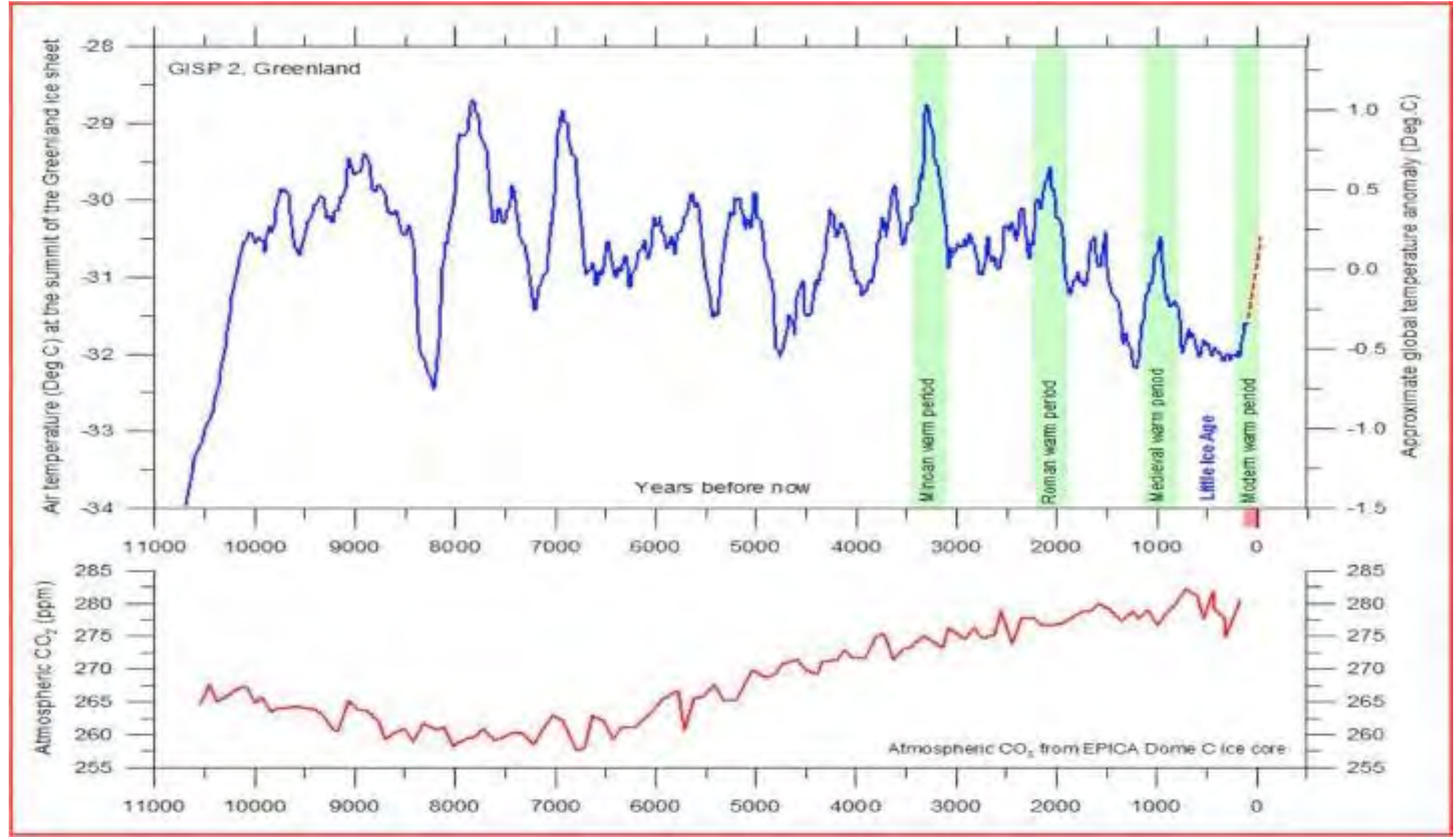
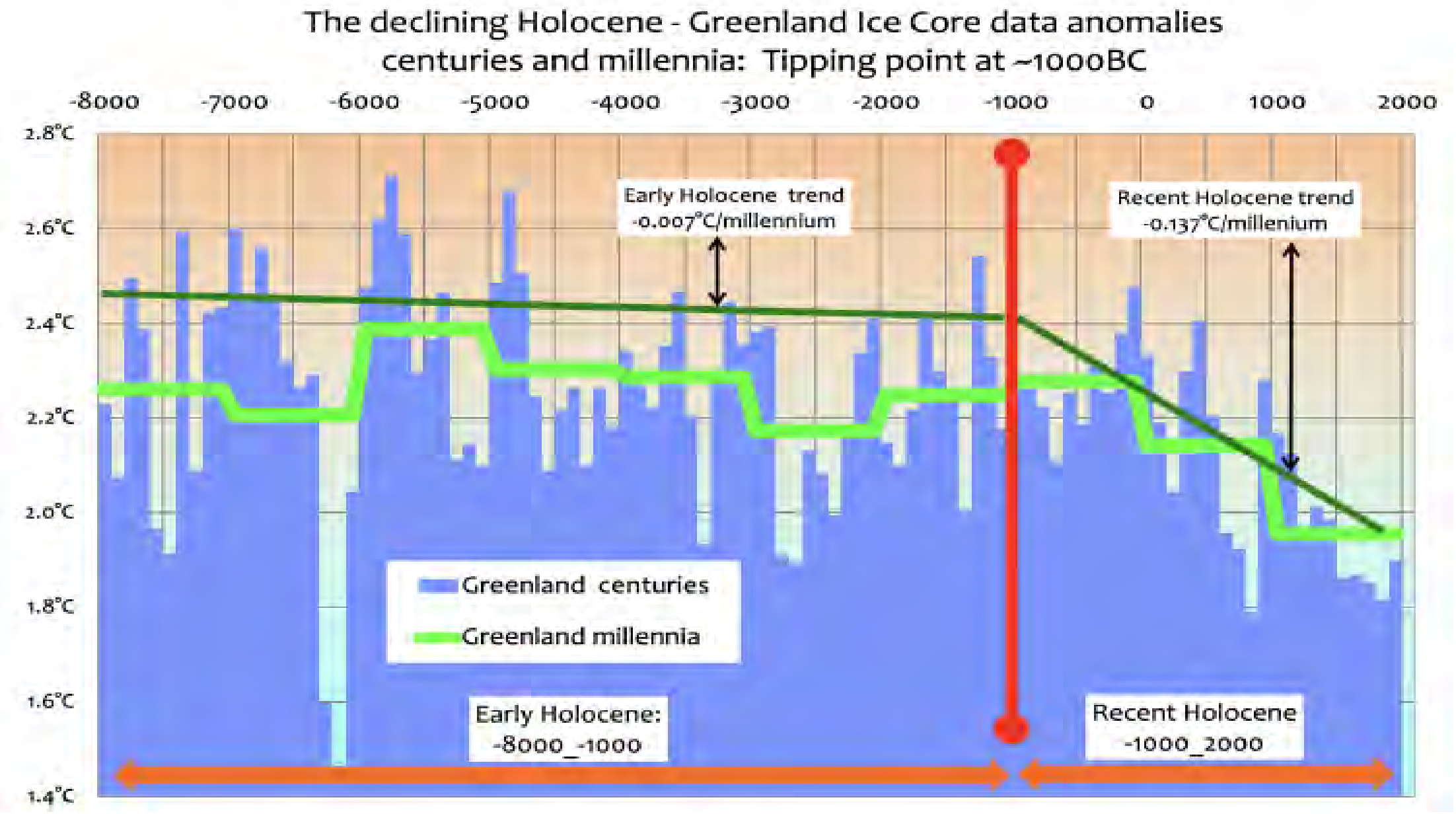
Years Before Present (1950 AD)
joannenova.com.au
David Lappi


GISP 2, Greenland
Air temperature (Deg C) at the summit of the Greenland ice sheet
-28
-29
-30
-31
-32
-33
-34
Years before now
Minoan warm period
Roman warm period
Medieval warm period
Little Ice Age
Modern warm period
Approximate global temperature anomaly (Deg.C)
1.0
0.5
0.0
-0.5
-1.0
-1.5
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Atmospheric CO_2 (ppm)
285
280
275
270
265
260
255
Atmospheric CO_2 from EPICA Dome C ice core

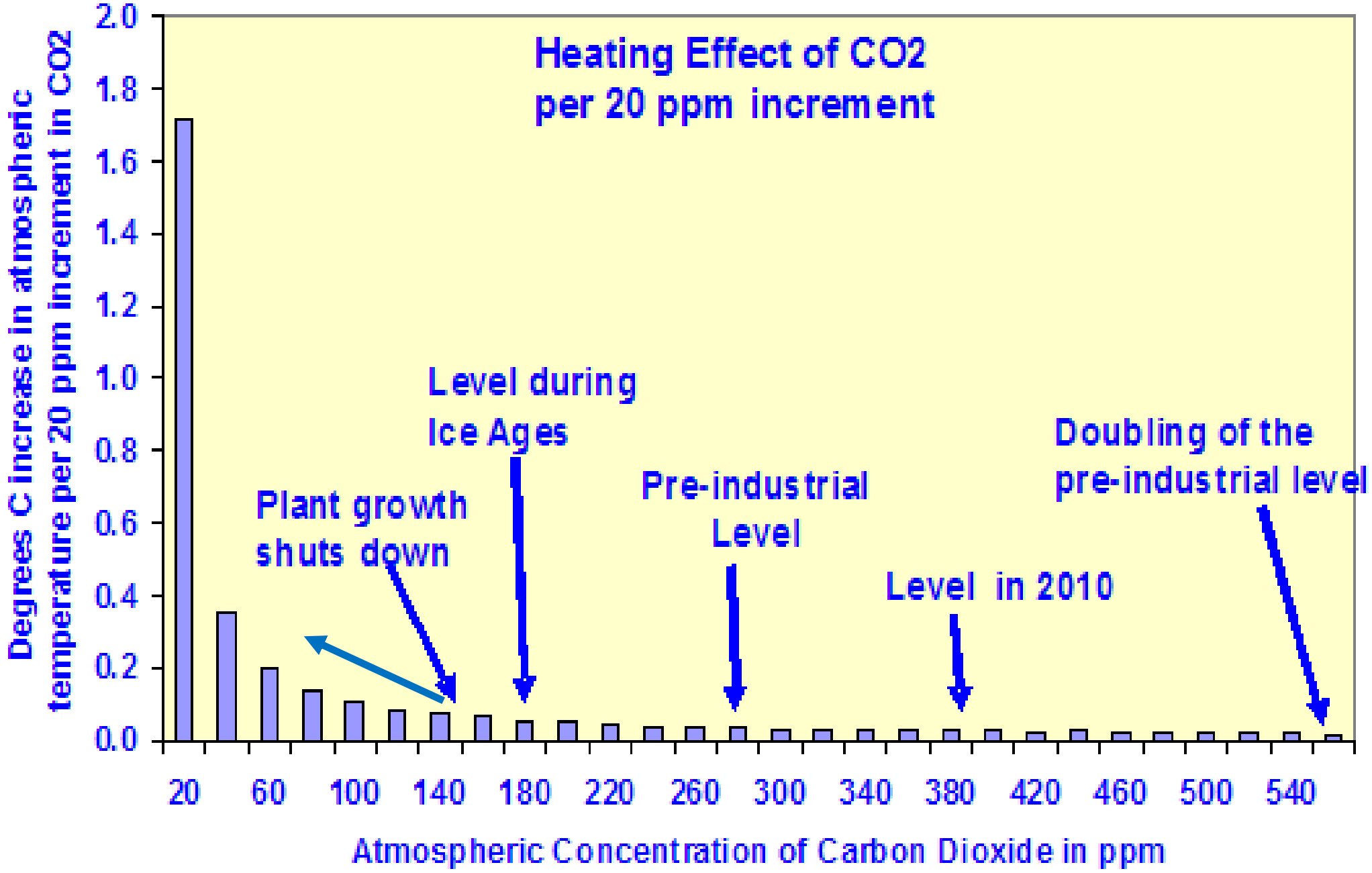


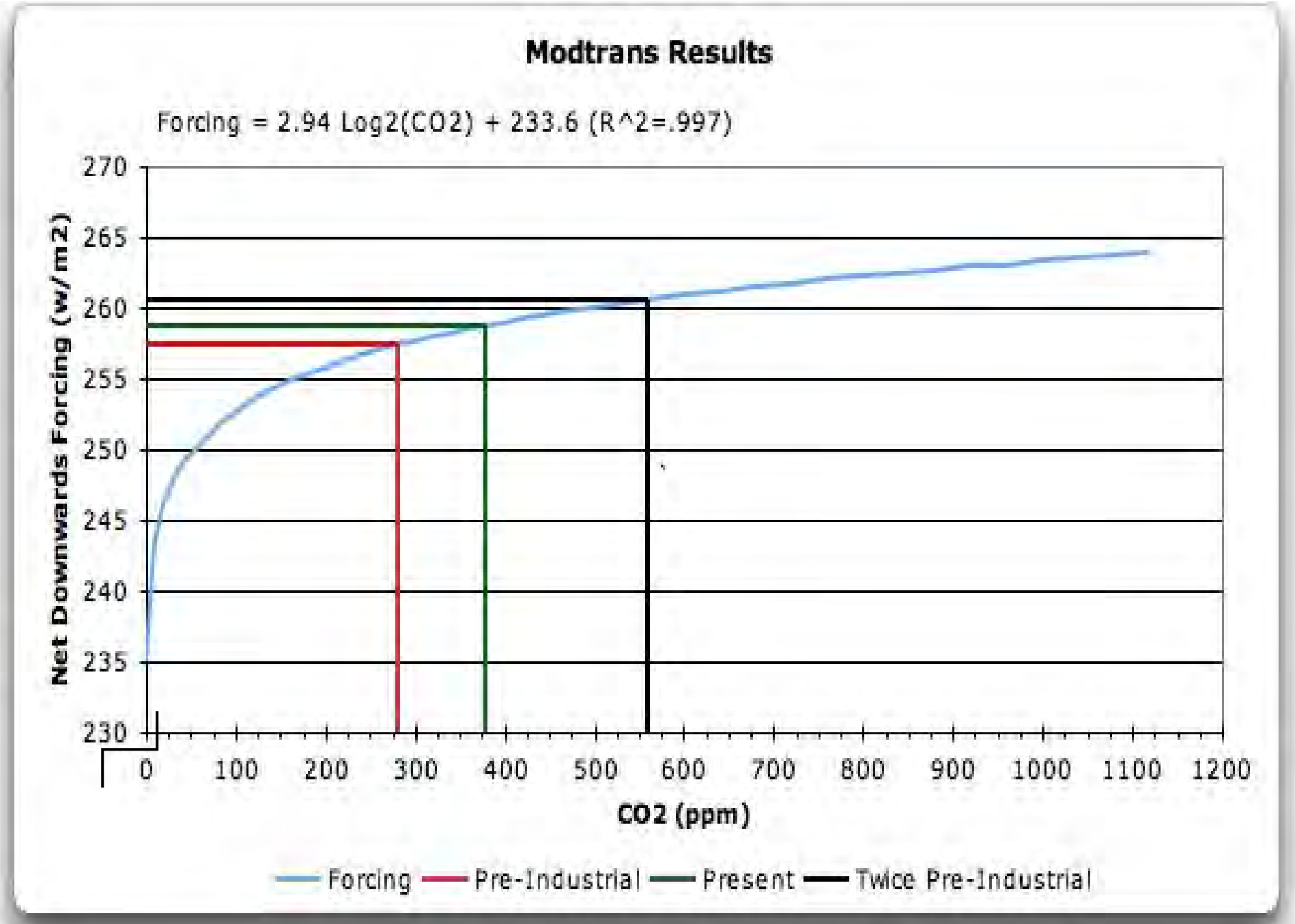
https://edmhdotme.wordpress.com/2015/06/01/the-holocene-context-for-anthropogenic-global-warming-2/

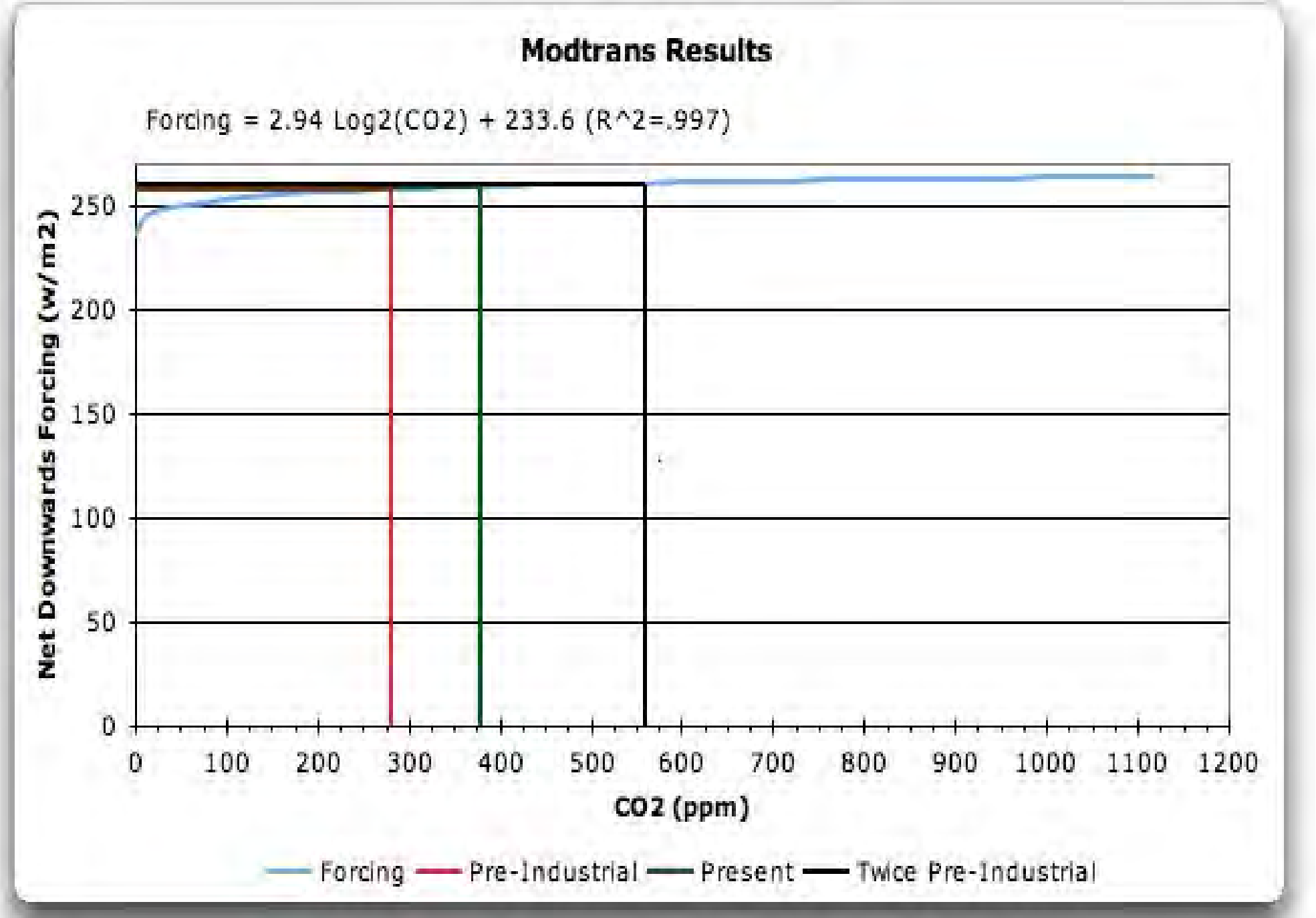
CO_2 Issues

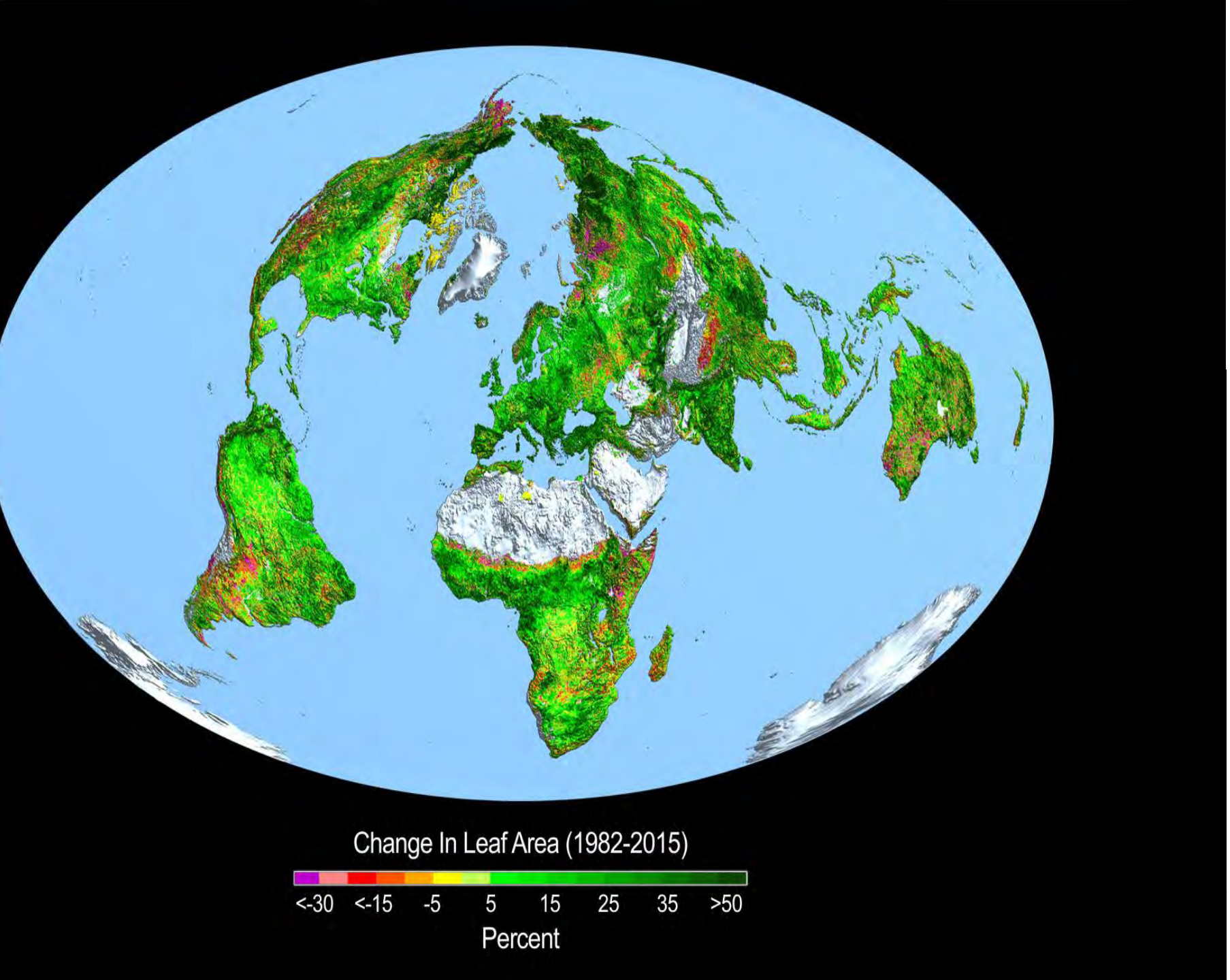
CO_2 Issues

- CO_2 absorbs radiation in specific infrared bands
- The amount of absorption is logarithmic with CO_2 concentration
- CO_2 is necessary for all life including ocean life, and starts with photosynthesis.
- Ocean contains ~50x more CO_2 than atmosphere, ~19x land biosphere. ~93% of total CO_2 not sequestered in rock
- All green plants will die if CO_2 falls below about 150 ppm
- About 90% of the mass of vegetation comes from CO_2 absorbed from the air and water from the air and ground
- All the carbon in carbohydrates comes from CO_2 in the air
- Optimum CO_2 levels for greenhouses is about 1800 ppm
- Submarines limit CO_2 continuous exposure to 5000 ppm
- Exhaled breath CO_2 concentration is 30,000 to 40,000 ppm


Heating Effect of CO2
per 20 ppm increment
Degrees C increase in atmospheric temperature per 20 ppm increment in CO2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Level during
Ice Ages
Plant growth
shuts down
Pre-industrial
Level
Level in 2010
Doubling of the
pre-industrial level
20
60
100
140
180
220
260
300
340
380
420
460
500
540
Atmospheric Concentration of Carbon Dioxide in ppm


Modtrans Results
Forcing = 2.94 Log2(CO2) + 233.6 (R^2=.997)
Net Downwards Forcing (w/m2)
270
265
260
255
250
245
240
235
230
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
CO2 (ppm)
Forcing
Pre-Industrial
Present
Twice Pre-Industrial


Modtrans Results
Forcing = 2.94 Log2(CO2) + 233.6 (R^2=.997)
Net Downwards Forcing (w/m2)
250
200
150
100
50
0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
CO2 (ppm)
Forcing
Pre-Industrial
Present
Twice Pre-Industrial



Change in leaf area 1982 - 2015

Pine trees grown at ambient CO_2 and three higher CO2 concentrations under controlled conditions

https://plantsneedco2.org/default.aspx?MenuItemID=103

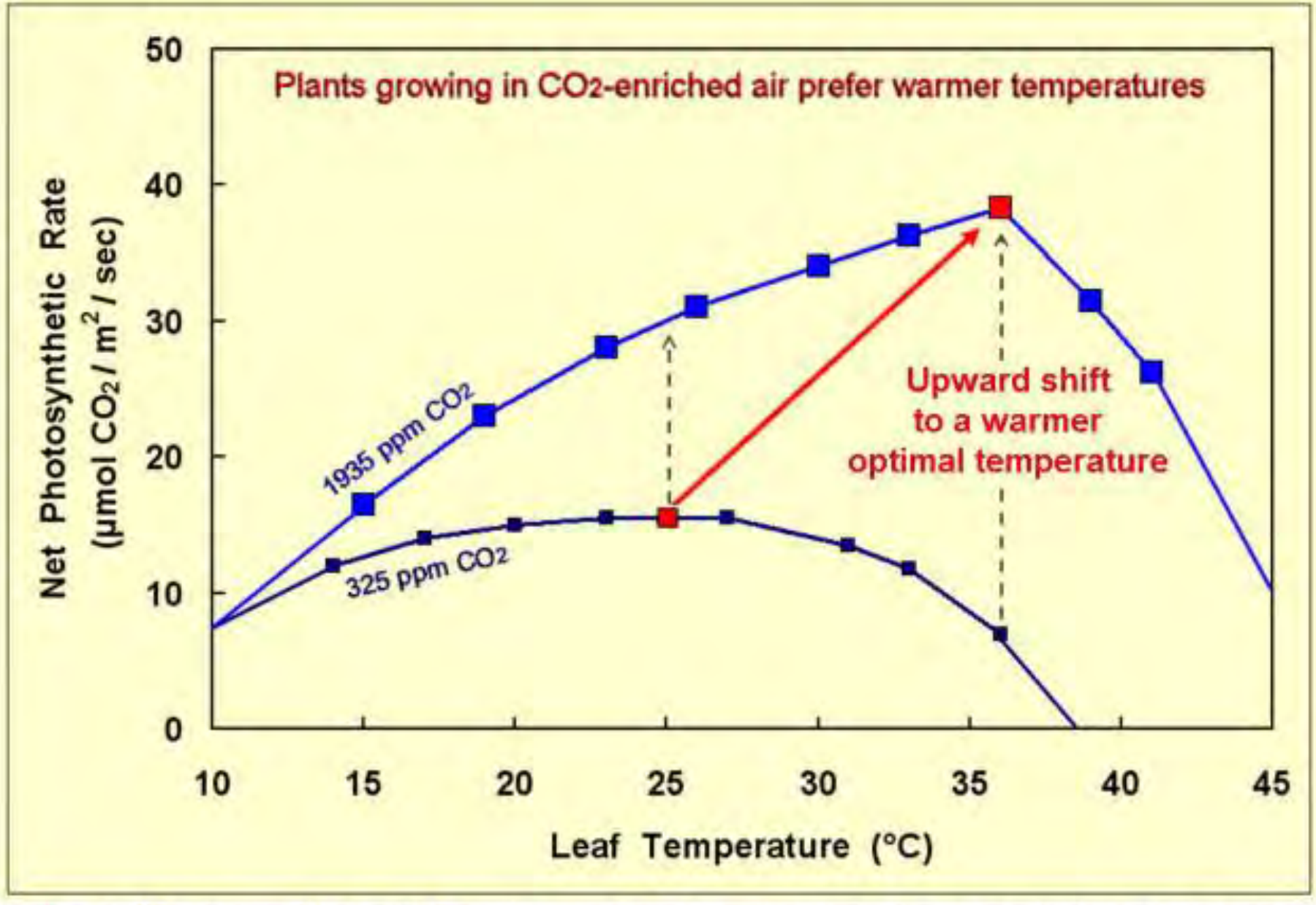
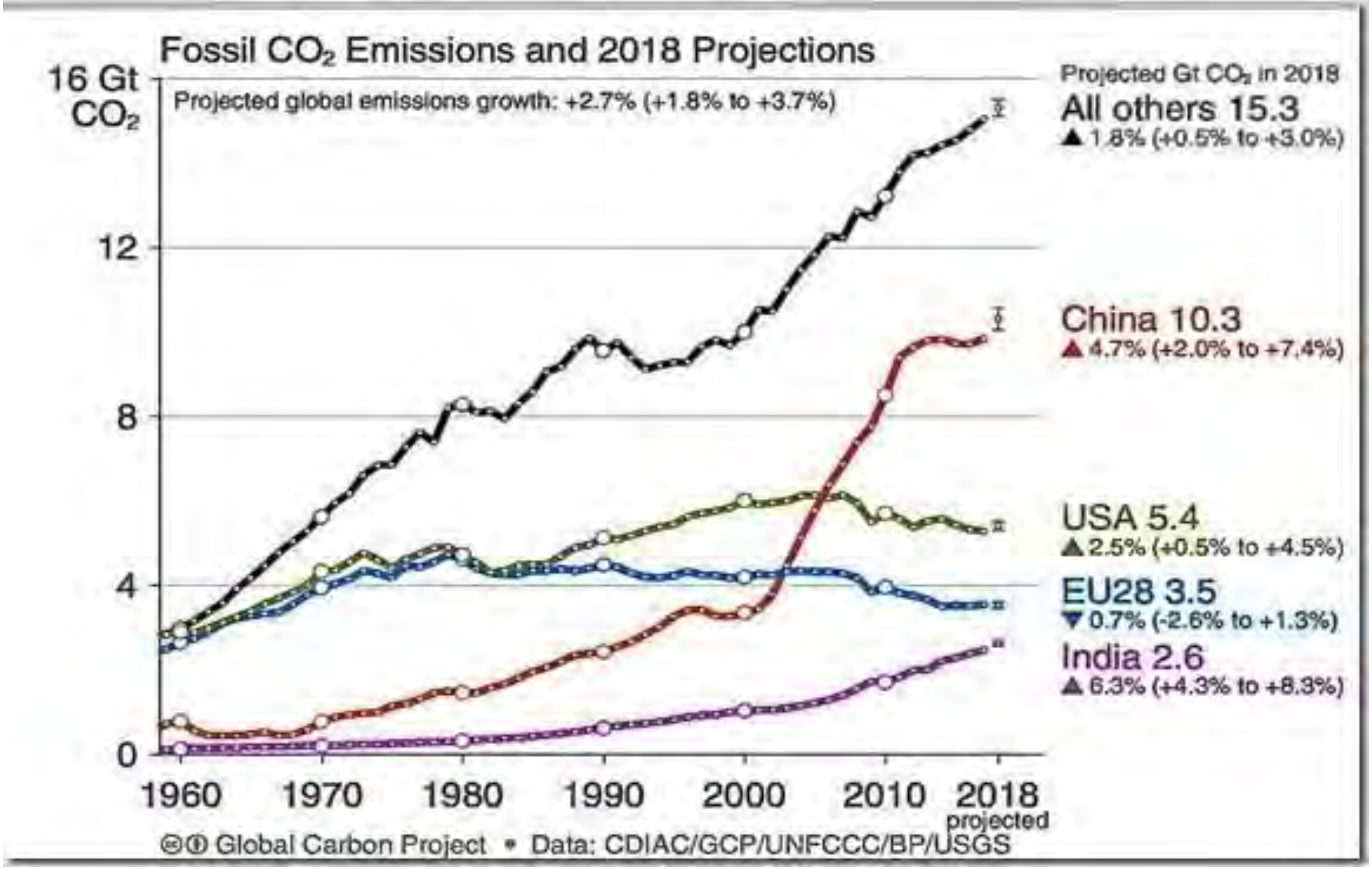
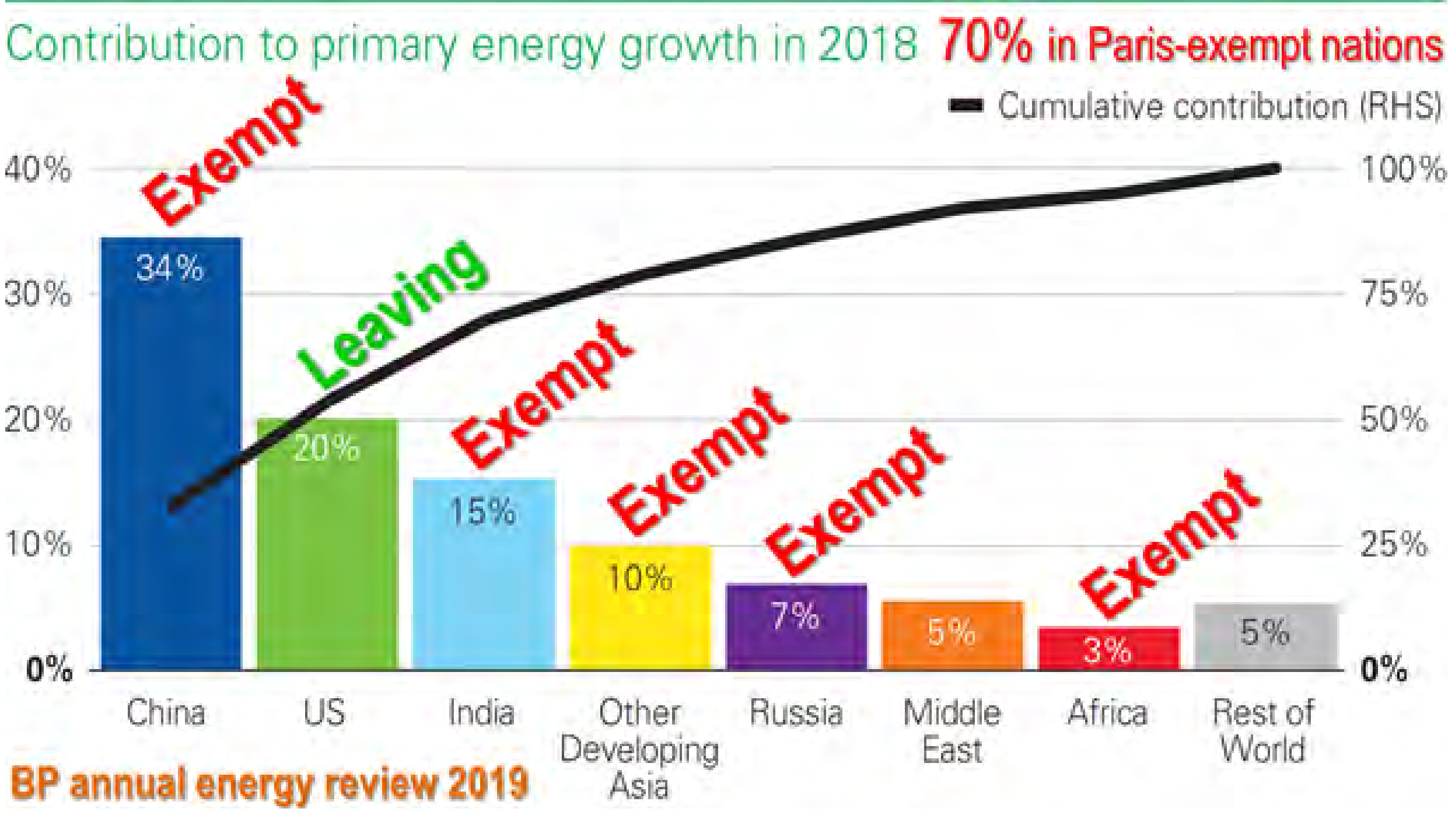


Figure 29. Net photosynthesis of big tooth aspen leaves growing under two concentrations of atmospheric carbon dioxide at various temperatures. Adapted from Jurik et al. (1984).


Fossil CO_2 Emissions and 2018 Projections
16 Gt CO_2
Projected global emissions growth: +2.7% (+1.8% to +3.7%)
12
8
4
0
1960
1970
1980
1990
2000
2010
2018 projected
Projected Gt CO_2 in 2018
All others 15.3
▲1.8% (+0.5% to +3.0%)
China 10.3
▲4.7% (+2.0% to +7.4%)
USA 5.4
▲2.5% (+0.5% to +4.5%)
EU28 3.5
▼0.7% (-2.6% to +1.3%)
India 2.6
▲6.3% (+4.3% to +8.3%)
Global Carbon Project • Data: CDIAC/GCP/UNFCCC/BP/USGS


Contribution to primary energy growth in 2018
70% in Paris-exempt nations
Cumulative contribution (RHS)
40%
30%
20%
10%
0%
100%
75%
50%
25%
0%
Exempt
Leaving
Exempt
Exempt
Exempt
Exempt
34%
20%
15%
10%
7%
5%
3%
5%
China
US
India
Other Developing Asia
Russia
Middle East
Africa
Rest of World
BP annual energy review 2019

China Fires Up Coal Power Plant Construction

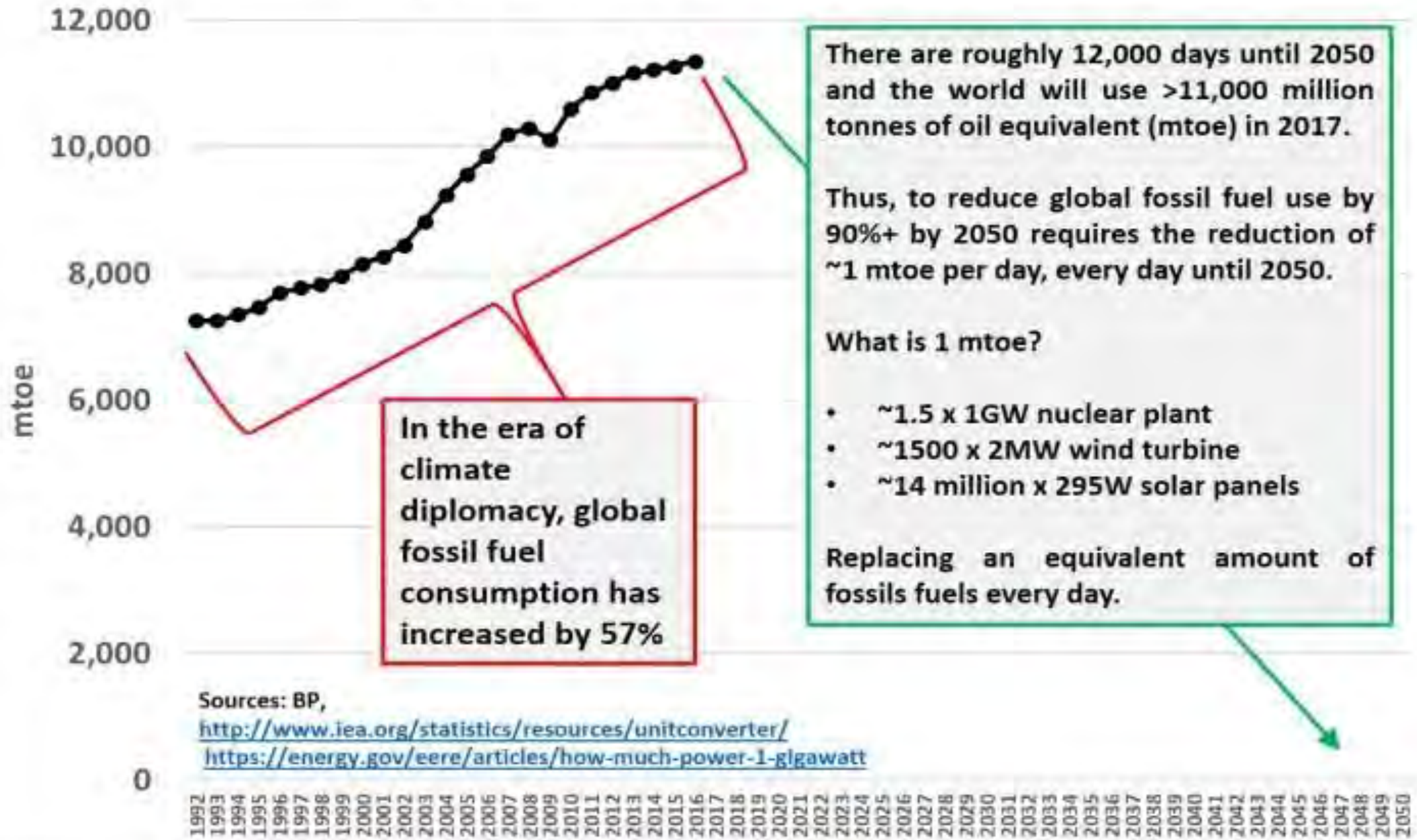
- By Chen Xuewan and Yang Ge
- China approved nearly 10 gigawatts (GW) of new coal-fired power generation capacity in this year's first quarter, roughly equal to the amount approved for all of last year, amid a broader scramble to jumpstart an economic hobbled by the Covid-19 epidemic.
- Caixin Global, 24 April 2020 via **GWPF Newsletter 01 May 2020**

- Global coal-fired generation capacity saw a net decline of **2.9 gigawatts** (GW) from January to June, the first drop on record for a six-month period, thanks to plant retirements in Europe and elsewhere, the U.S.-based think tank Global Energy Monitor (GEM) said in the study.
- SHANGHAI: China has nearly 250 gigawatts (GW) of coal-fired power now under development, more than the entire coal power capacity of the United States, a new study said on Thursday, casting doubt on the country's commitments to cutting fossil fuel use.
- ET Energyworld.com From The Economic Times
  - Reuters
  - June 25, 2020, 08:28 IST

- **Forget Paris: Russia Boosts Coal Production: Will Be World's Top Exporter Within Decade**
  Russia Today, 2 May 2020

  The world's largest coal-producing country, Russia, plans to increase its output and exports over the next 15 years. Russia's share of the global coal export market is projected to expand to 25 percent from the current 11 percent.

Global Fossil Fuel Consumption



In the era of climate diplomacy, global fossil fuel consumption has increased by 57%

There are roughly 12,000 days until 2050 and the world will use >11,000 million tonnes of oil equivalent (mtoe) in 2017.

Thus, to reduce global fossil fuel use by 90%+ by 2050 requires the reduction of ~1 mtoe per day, every day until 2050.

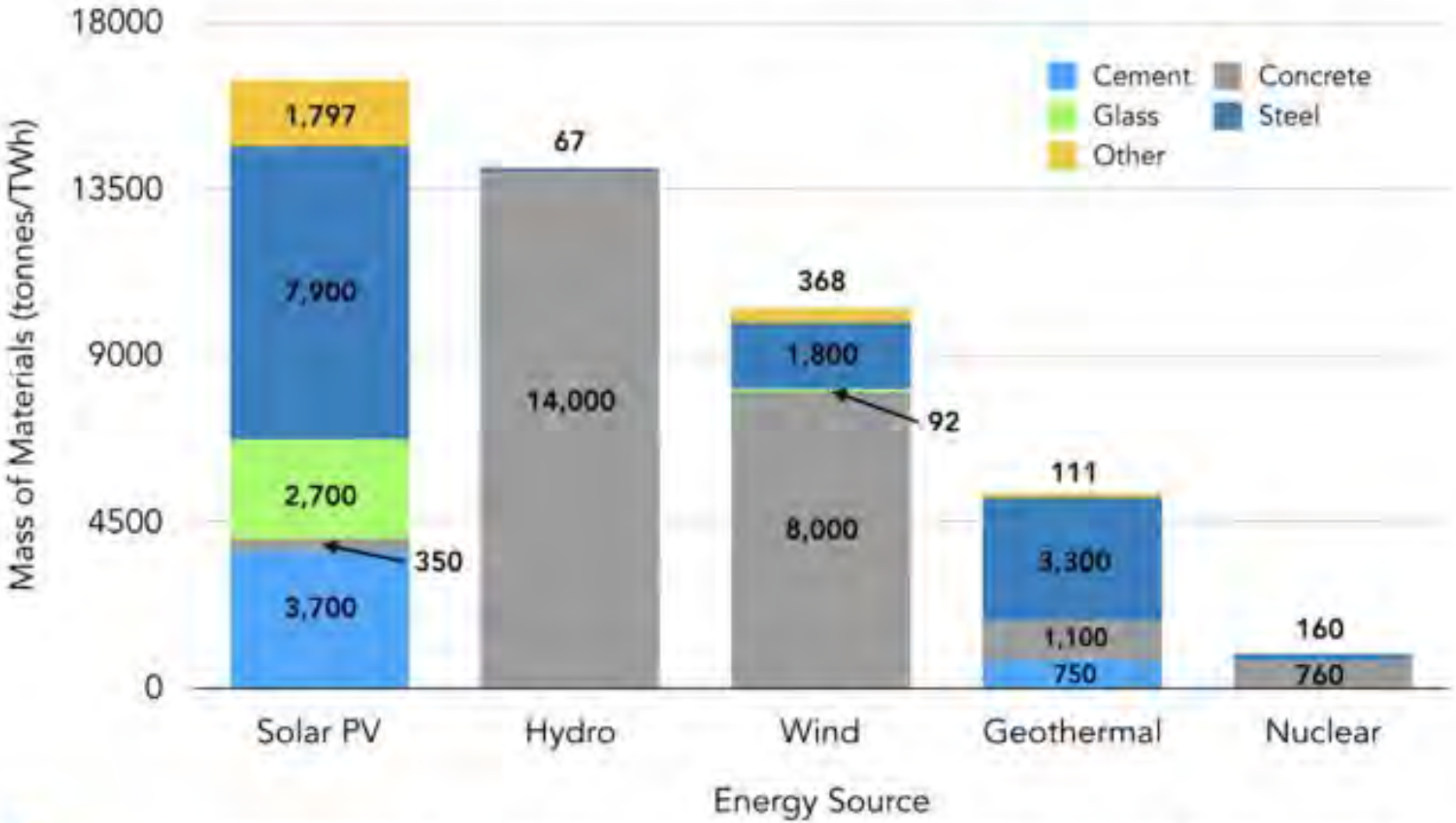
What is 1 mtoe?

- ~1.5 x 1GW nuclear plant
- ~1500 x 2MW wind turbine
- ~14 million x 295W solar panels

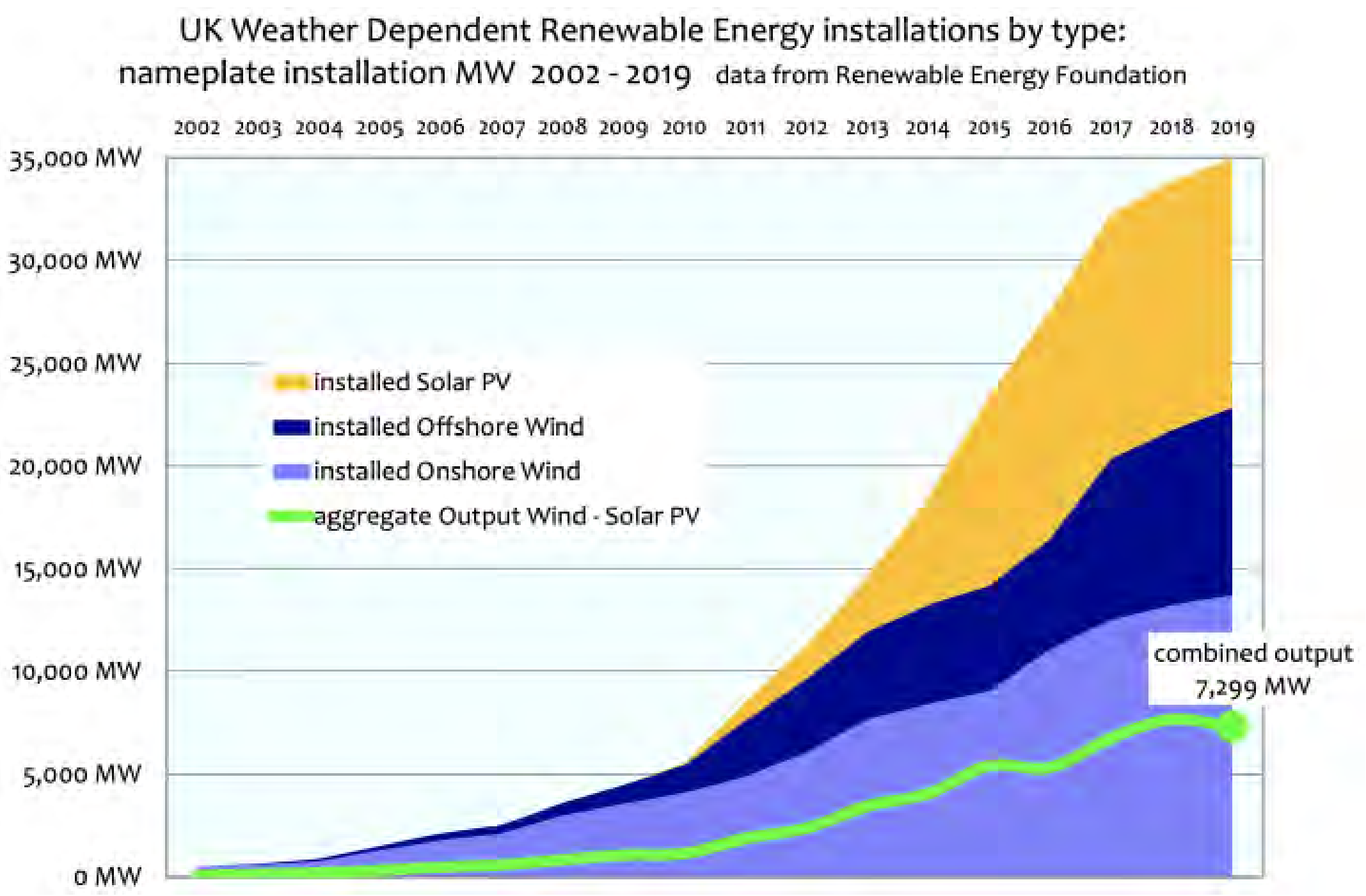
Replacing an equivalent amount of fossils fuels every day.

Sources: BP,
http://www.iea.org/statistics/resources/unitconverter/
https://energy.gov/eere/articles/how-much-power-1-gigawatt

Materials throughput by type of energy source



"Quadrennial Technology Review: An Assessment of Energy Technologies and Research Opportunities," Table 10. September 2015. United States Department of Energy. Nuclear and hydro require 10 tonnes/TWh and 1 tonne/TWh of other materials, respectively, but are unable to be labeled on the graph.


UK Weather Dependent Renewable Energy installations by type:
nameplate installation MW 2002 - 2019 data from Renewable Energy Foundation
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
35,000 MW
30,000 MW
25,000 MW
20,000 MW
15,000 MW
10,000 MW
5,000 MW
0 MW
installed Solar PV
installed Offshore Wind
installed Onshore Wind
aggregate Output Wind - Solar PV
combined output
7,299 MW

2019 UK installed Weather Dependent Renewables Fleet data

- **Solar, On-shore and Off-shore Wind**
  - ~8.5£billion/Gigawatt generated (with a future commitment of some ~35£billion/Gigawatt produced long-term)

Alternative generation costs

- Nuclear costs
  - ~5.5£billion/Gigawatt
- Gas-fired generation
  - less than 1£billion/Gigawatt

- **Idea of renewables powering UK is an 'appalling delusion' – David MacKay**

UK 2019 Weather Dependent Renewables as installed

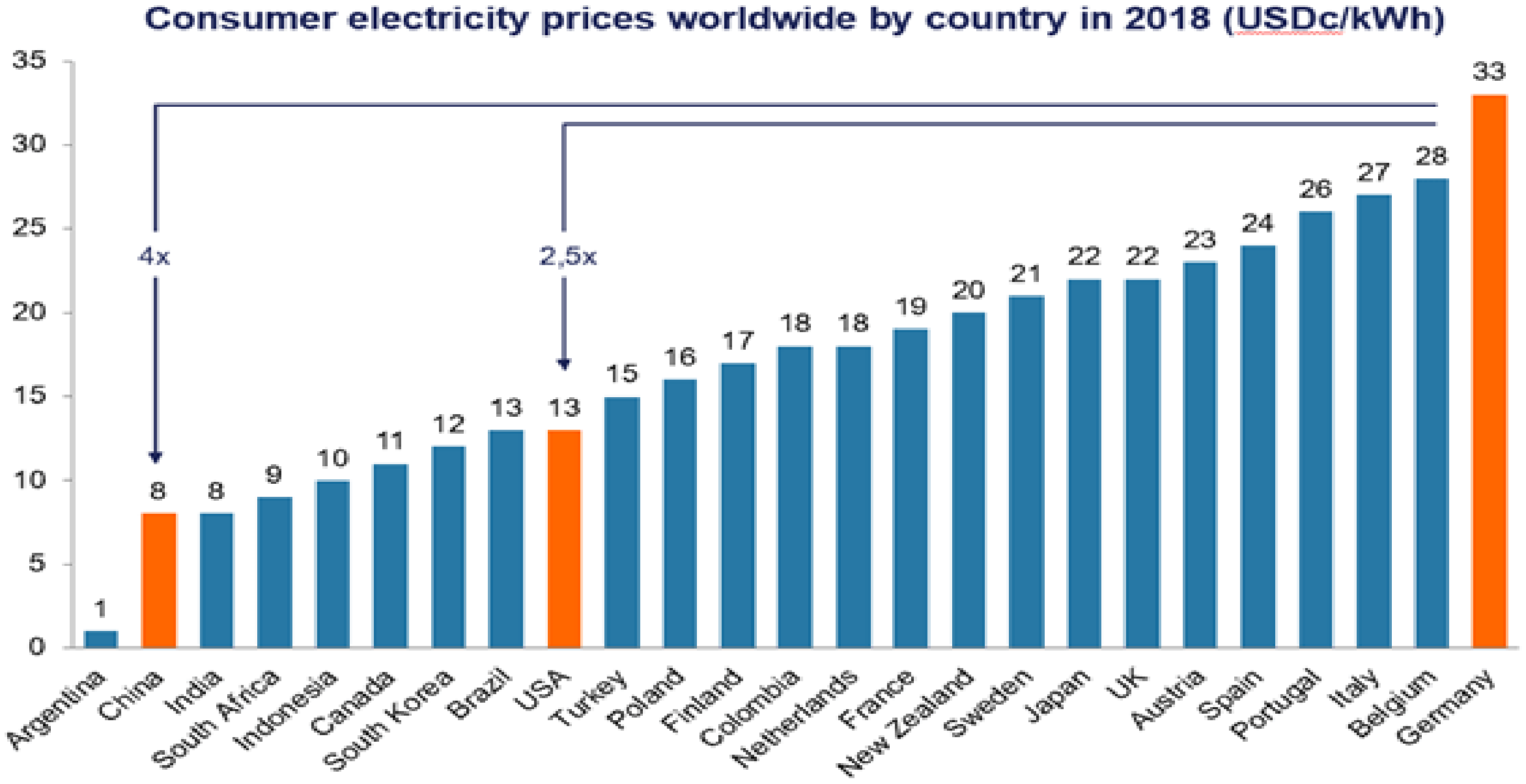
Renewable Energy Foundation collated data: US EIA cost data £1 ≅ 1.2 US$

	2019 Installed GW	2019 Output GW	2019 UK productivity percentages	Estimated Overnight Capital cost	Estimated 60 year Capital and Running costs
Onshore Wind	13.70 GW	3.13 GW	22.9%	15.1 £bn	54.1 £bn
Offshore Wind	9.12 GW	2.89 GW	31.7%	33.2 £bn	149.4 £bn
Solar Photovoltaics on grid	12.13 GW	1.28 GW	10.5%	13.5 £bn	54.1 £bn
Combined Weather Dependent Renewables	34.95 GW	7.30 GW	20.9%	61.7 £bn	257.6 £bn
Nuclear cost for equivalent Generation		7.30 GW	90%	40.7 £bn	98.2 £bn
Gas-fired costs for equivalent Generation		7.30 GW	90%	6.4 £bn	21.2 £bn

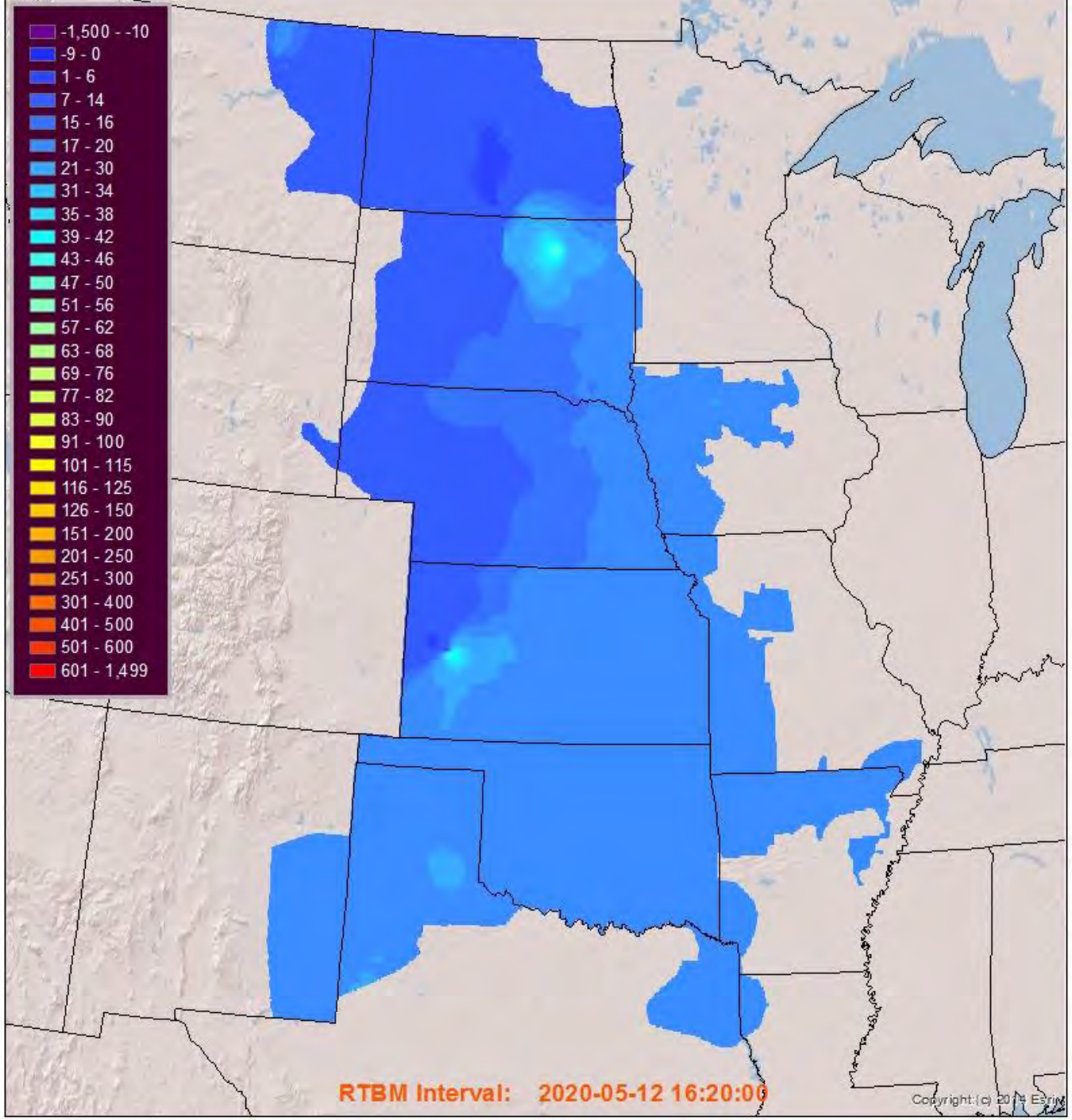
Warren Buffet on Wind Energy

- **"I will do anything that is basically covered by the law to reduce Berkshire's tax rate," Buffet told an audience in Omaha, Nebraska recently. "For example, on wind energy, we get a tax credit if we build a lot of wind farms. That's the only reason to build them. They don't make sense without the tax credit."**

Previously published in the October 2020, issue of International Cement Review



by Dr. Lars Schernikau, HMS Bergbau Group, Germany & Singapore

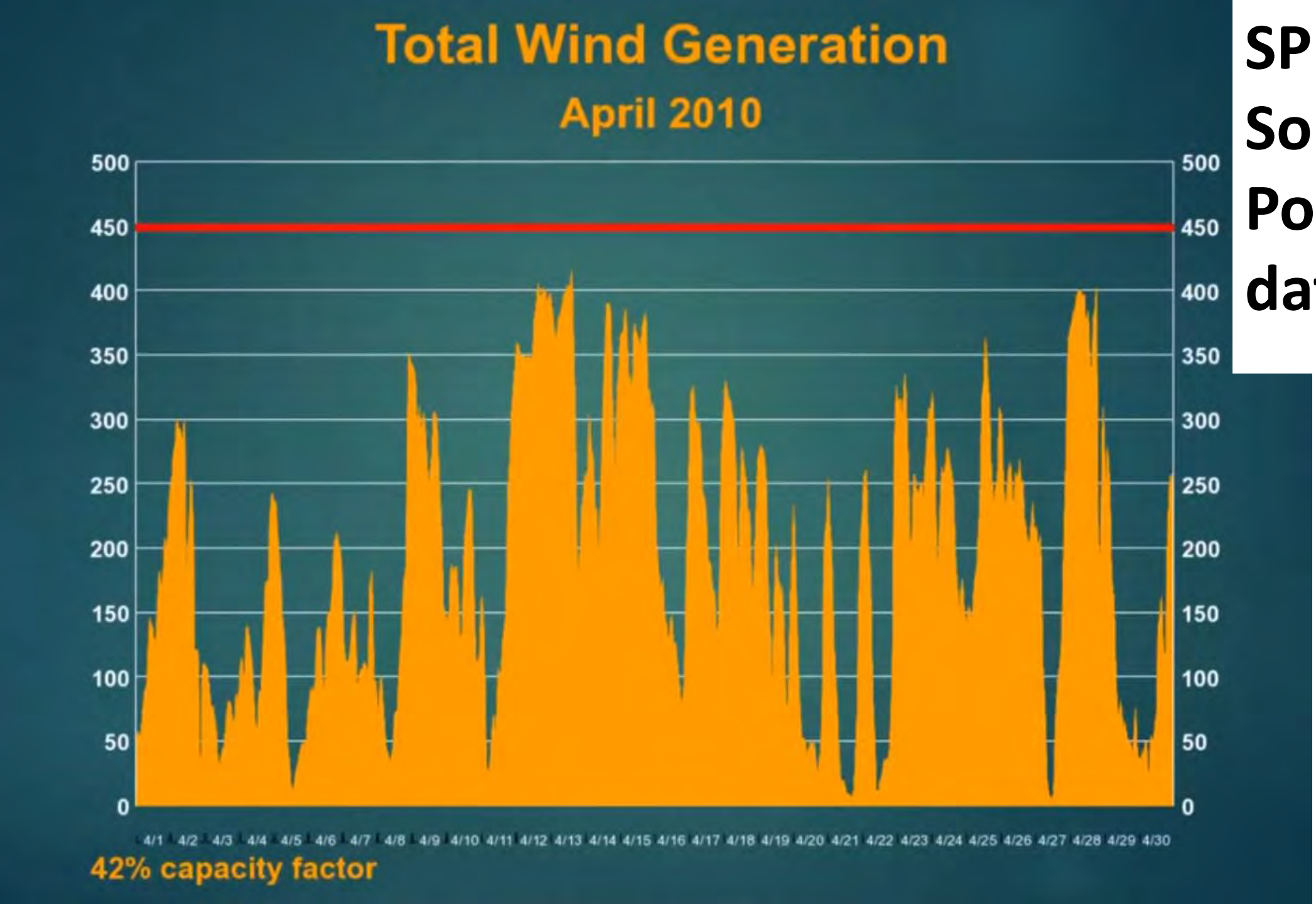


Map of the Southwest Power Pool

- **Coincident peak load**: 50,662 MW (Aug. 19, 2019)
- **Winter peak load**: 43,584 MW (Jan. 17, 2018)
- **Generating capacity**: 90,466 MW (based on nameplate capacity as of Jan. 17, 2018)

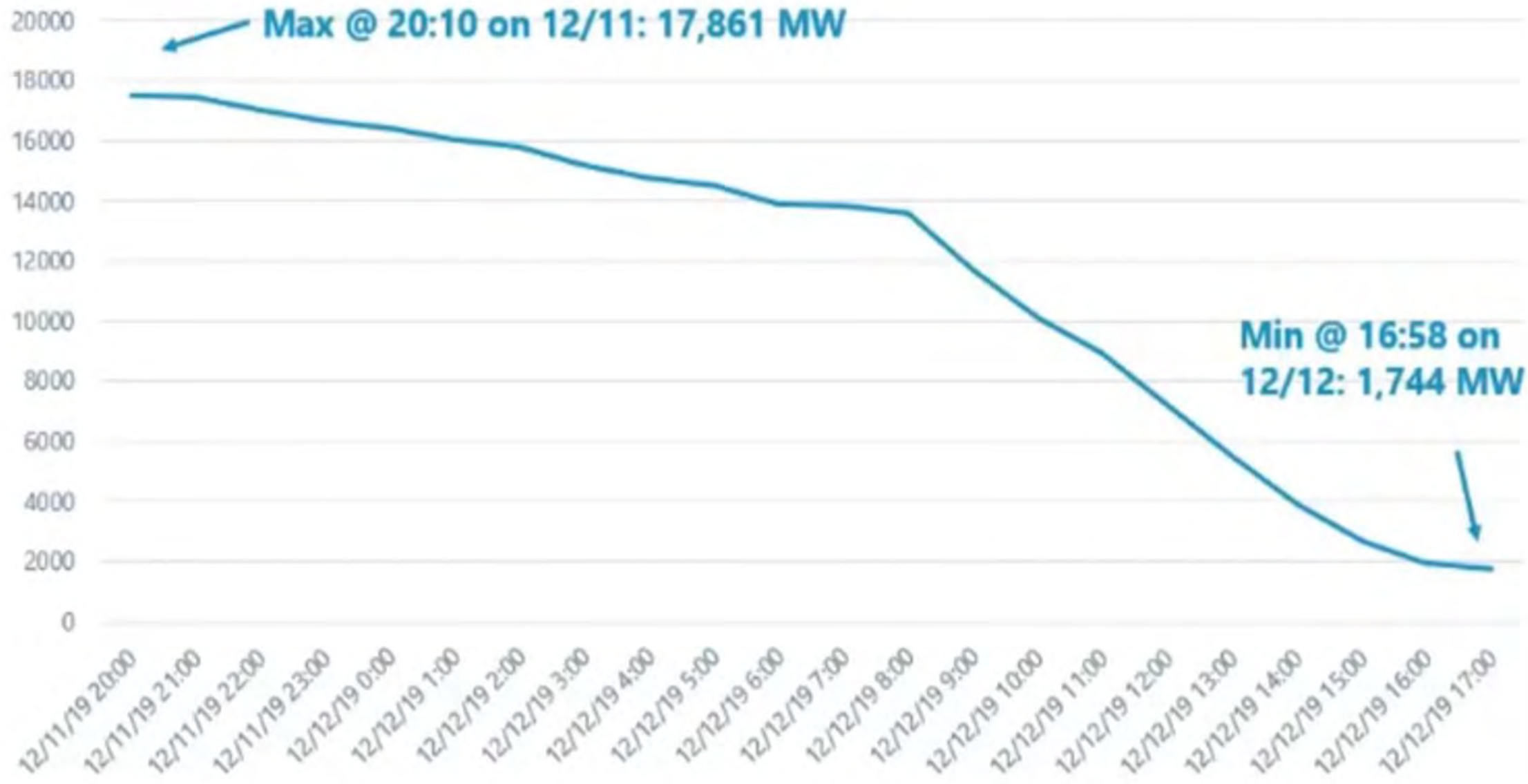
•**Generating capacity**: 90,466 MW (based on nameplate capacity as of Jan. 10, 2020)

•40.9% natural gas
•26% coal
•24.9% wind
•3.8% hydro
•2.3% nuclear
•1.7% fuel oil
•0.2% solar
•0.1% other



SPP Southwest Power Pool data

WHY FUEL DIVERSITY MATTERS: SPP'S RECORD WIND SWING (16 GW IN 21 HOURS)

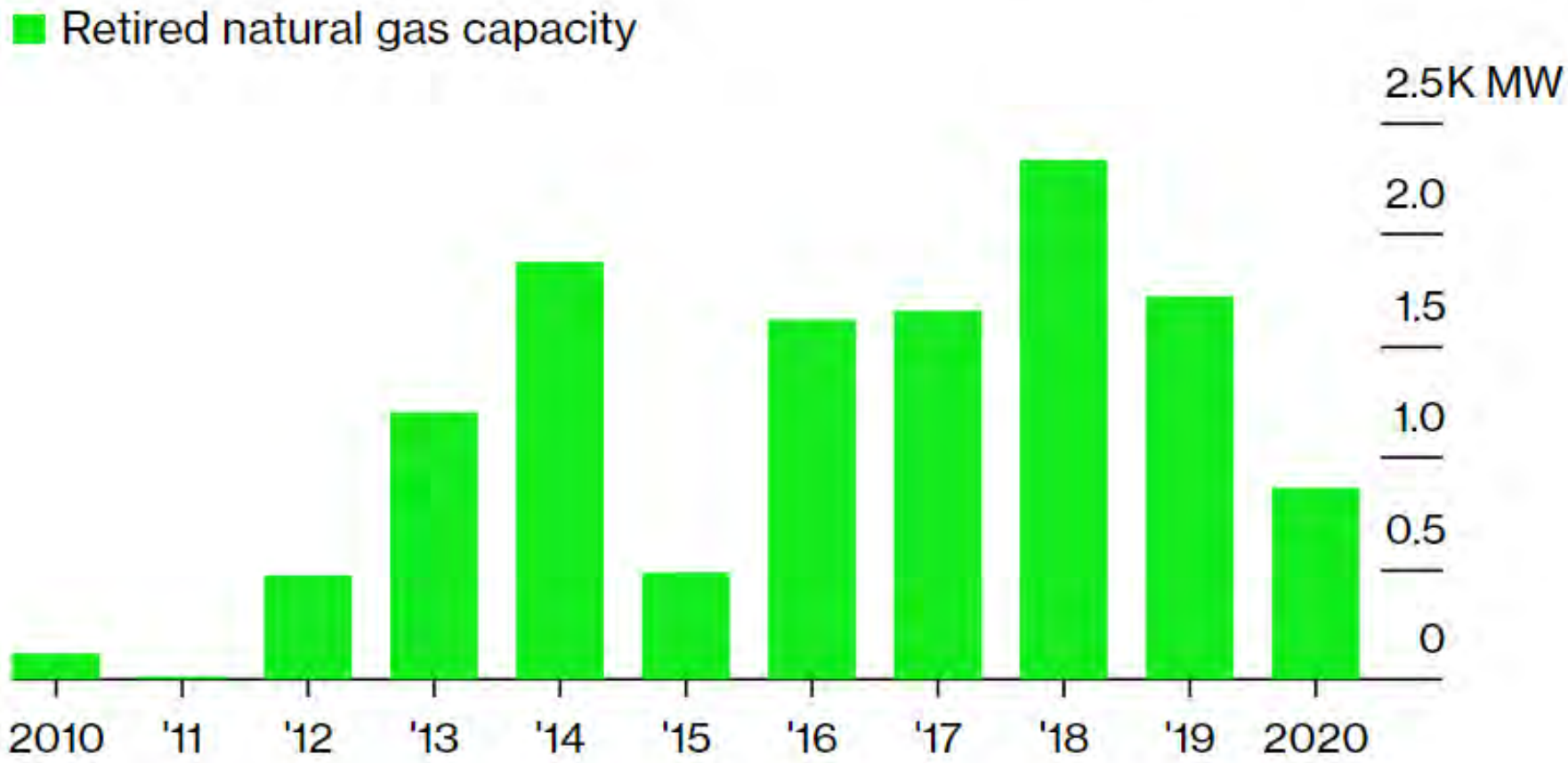


- One thing that has made California's grid so vulnerable to soaring demand is the state's rapid shift away from natural gas. About 9 gigawatts of gas generation, enough to power 6.8 million homes, have been retired over the past five years as the state turns increasingly to renewables, according to BloombergNEF. That leaves fewer options when the sun sets and solar production wanes.

Bloomberg Green

Vanishing Gas

California has aggressively shuttered gas plants in the shift to clean energy



Source: EIA

ENERGY

‘Gaps’ In Renewable Energy Led To Blackouts For Millions Of Californians, Gov Newsom Says

Two Films Showing Environmental Destruction by “Green Energy”

- **BURNED: Are Trees the New Coal?**
- https://vimeo.com/286550378

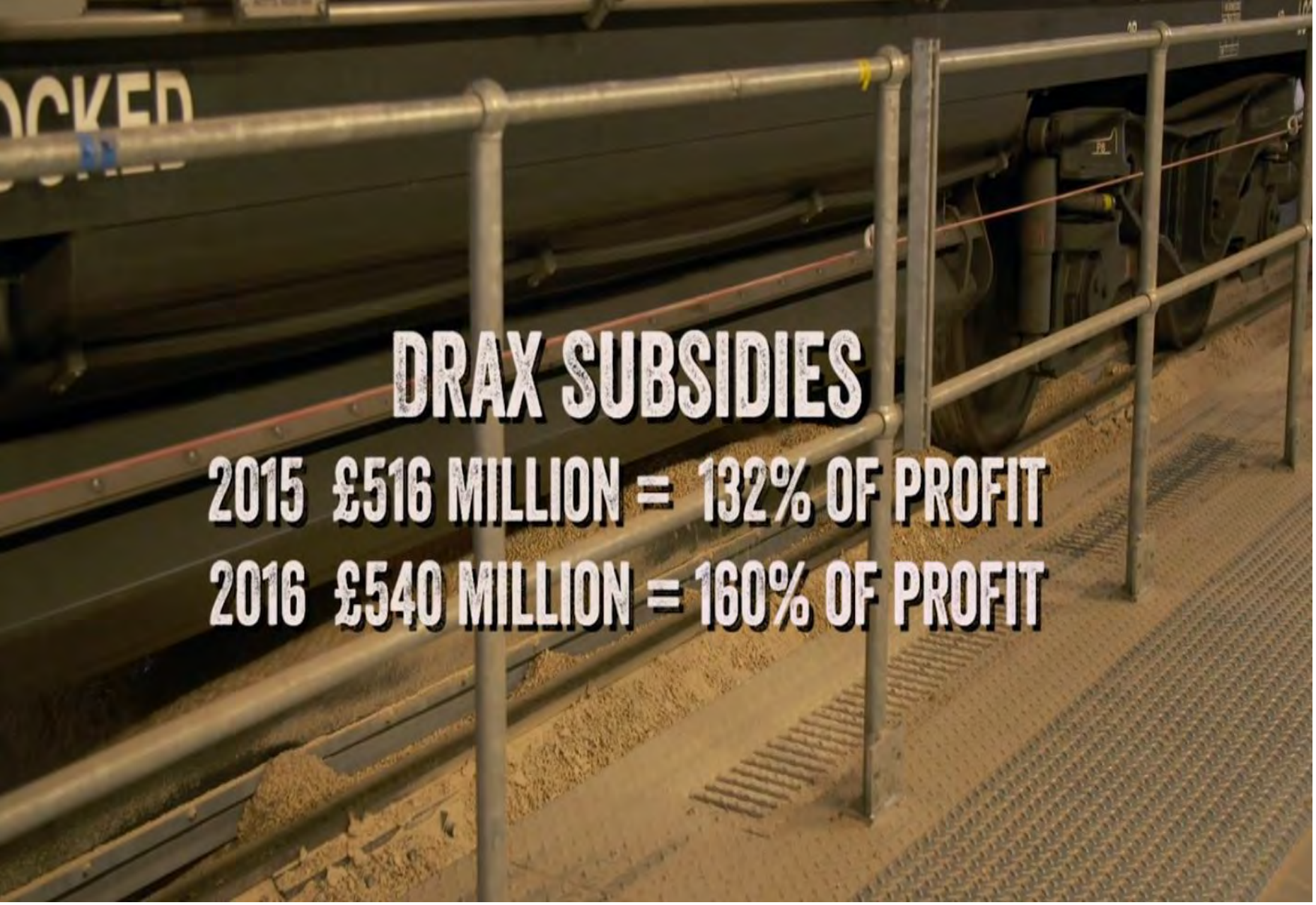
- **Planet of the Humans, Michael Moore’s latest documentary**
- https://www.youtube.com/watch?v=Zk11vI-7czE
- **“Michael Moore-backed ‘Planet of the Humans’ Takes Apart the Left’s Green Energy Scams”**

The Washington Post

HOW EUROPE'S CLIMATE POLICIES LED TO MORE U.S. TREES BEING CUT DOWN

The New York Times

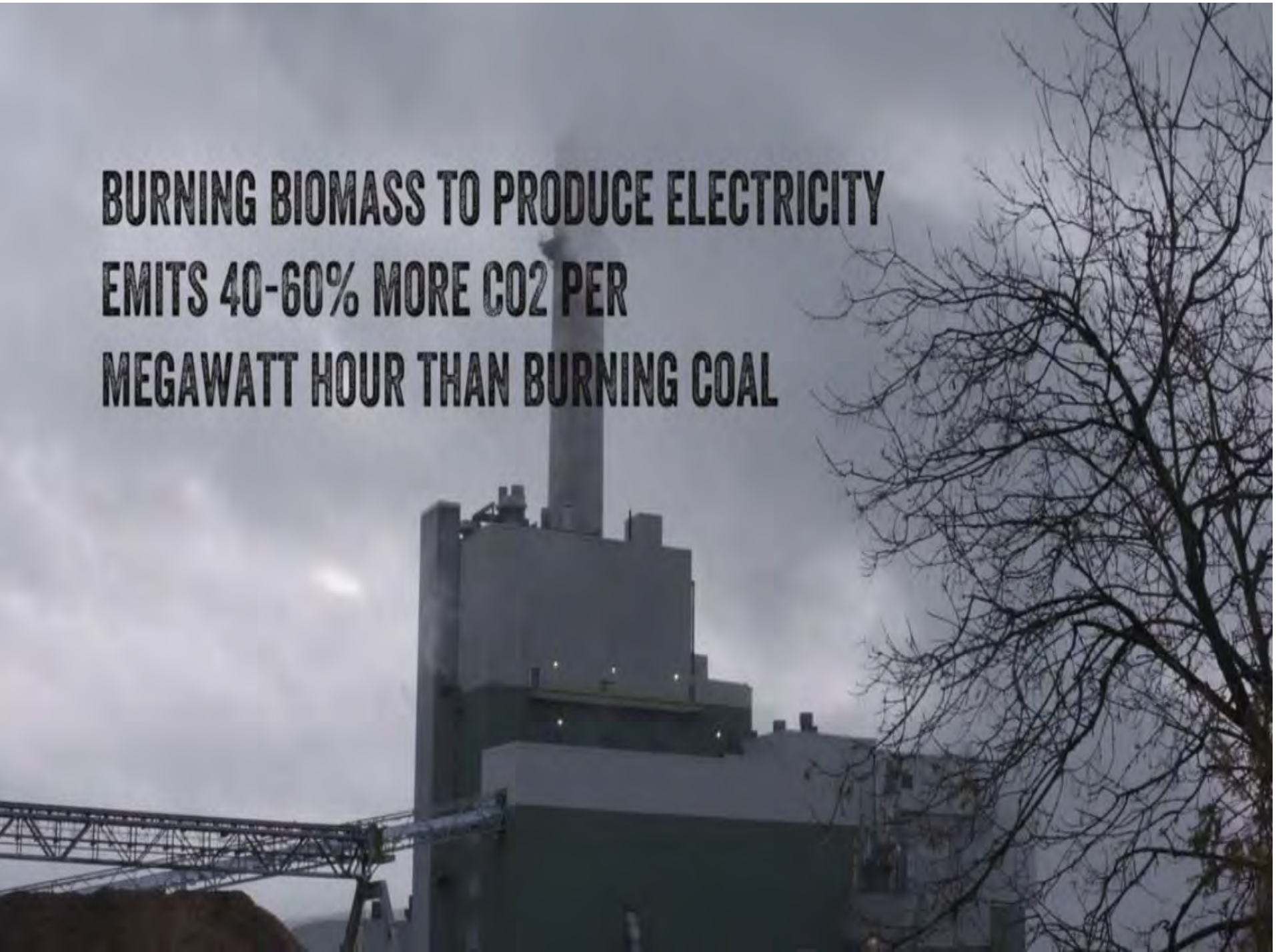
Flawed Carbon Accounting Drives Boom in Burning U.S. Forests in E.U. Power Plants



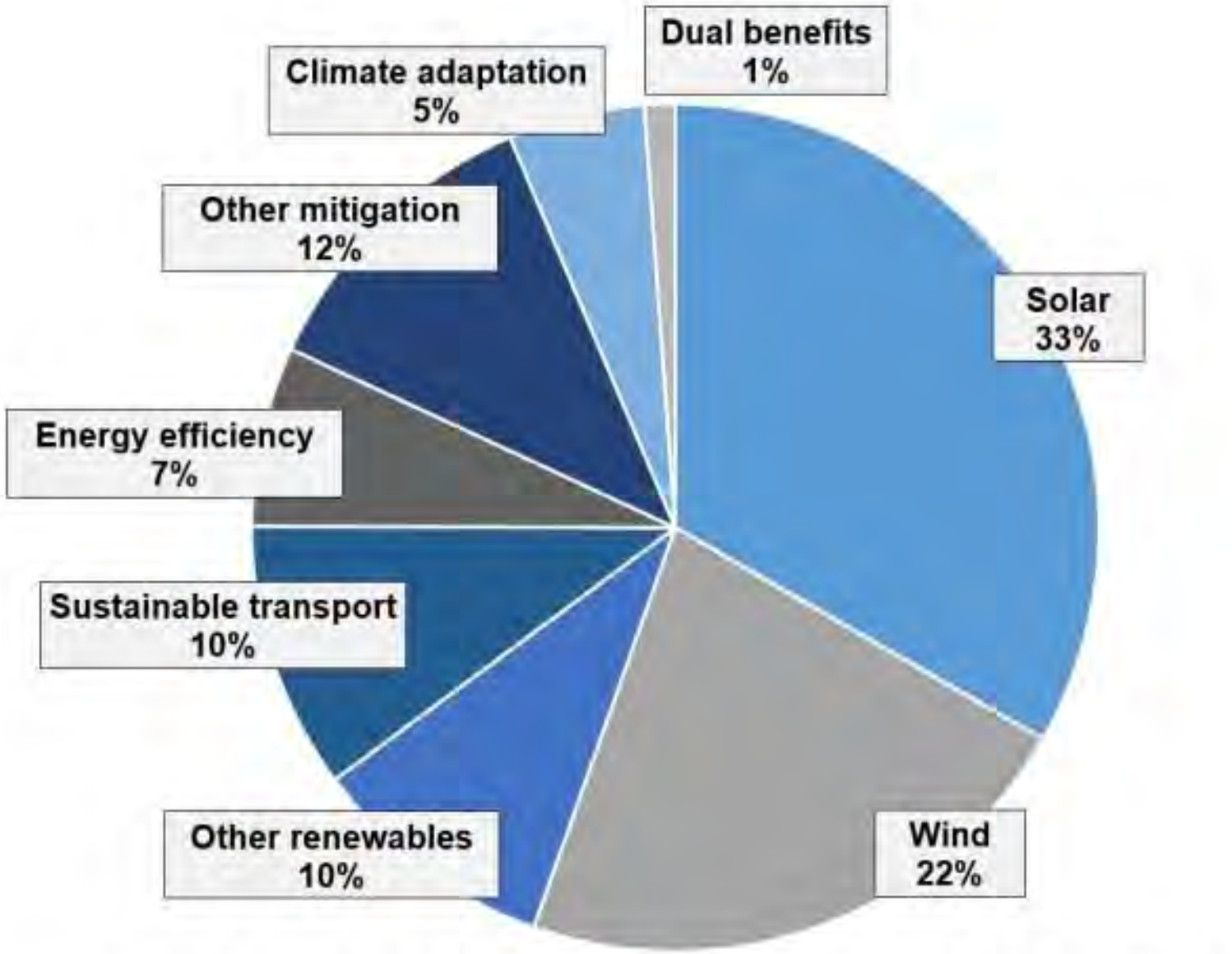
Largest power plant in UK

Largest biomass burner in the world

Burns the equivalent of 1 acre of forest per hour



But “it’s renewable, so it’s GREEN ENERGY!”



Global climate change expenditure, 2011–2018

Source: Climate Policy Initiative

The world spent US$3.660 trillion on climate change projects over the eight-year period 2011–2018. $2.013 trillion on solar and wind

Summary

- The null hypothesis – “the observed climate is within normal variations” – has not been disproved. It is well within statistical bounds
- The AGW hypothesis **has been disproven**, and in fact, there is **no scientific evidence** of it.
  - All projections of this hypothesis have failed.
  - The only support of the hypothesis are the computer models which are known to be in error
- The Medieval Warm Period and the Roman Warm Period demonstrate against the hypothesis that man-made CO2 is causing unusual global warming

The Scientific Method

It doesn't matter how beautiful your theory is, it doesn't matter how smart you are. If it doesn't agree with experiment, it's wrong.

Richard P. Feynman

Christy's Conclusion

So the rate of accumulation of joules of energy in the tropical troposphere is significantly less than predicted by the CMIP5 climate models. Will the next IPCC report discuss this long-running mismatch? There are three possible ways they could handle the problem:

- The observations are wrong, the models are right.
- The forcings used in the models were wrong.
- The models are failed hypotheses.

I predict that the 'failed hypothesis' option will not be chosen. Unfortunately, that's exactly what you should do when you follow the scientific method.

So What?

- Massive mis-investment chasing unnecessary and ineffective solutions regarding CO_2
  - Inefficient and ecologically harmful “green energy” solutions
  - Restrictive regulations
  - Carbon tax and subsides distorting market
- Distraction from ecological problems we could solve
  - Wetland preservation
  - Clean water issues
  - Agricultural runoff control
  - Chemical and pharma pollutions (Prozac, hormones, cocaine, etc. in water)

Some Famous Skeptics

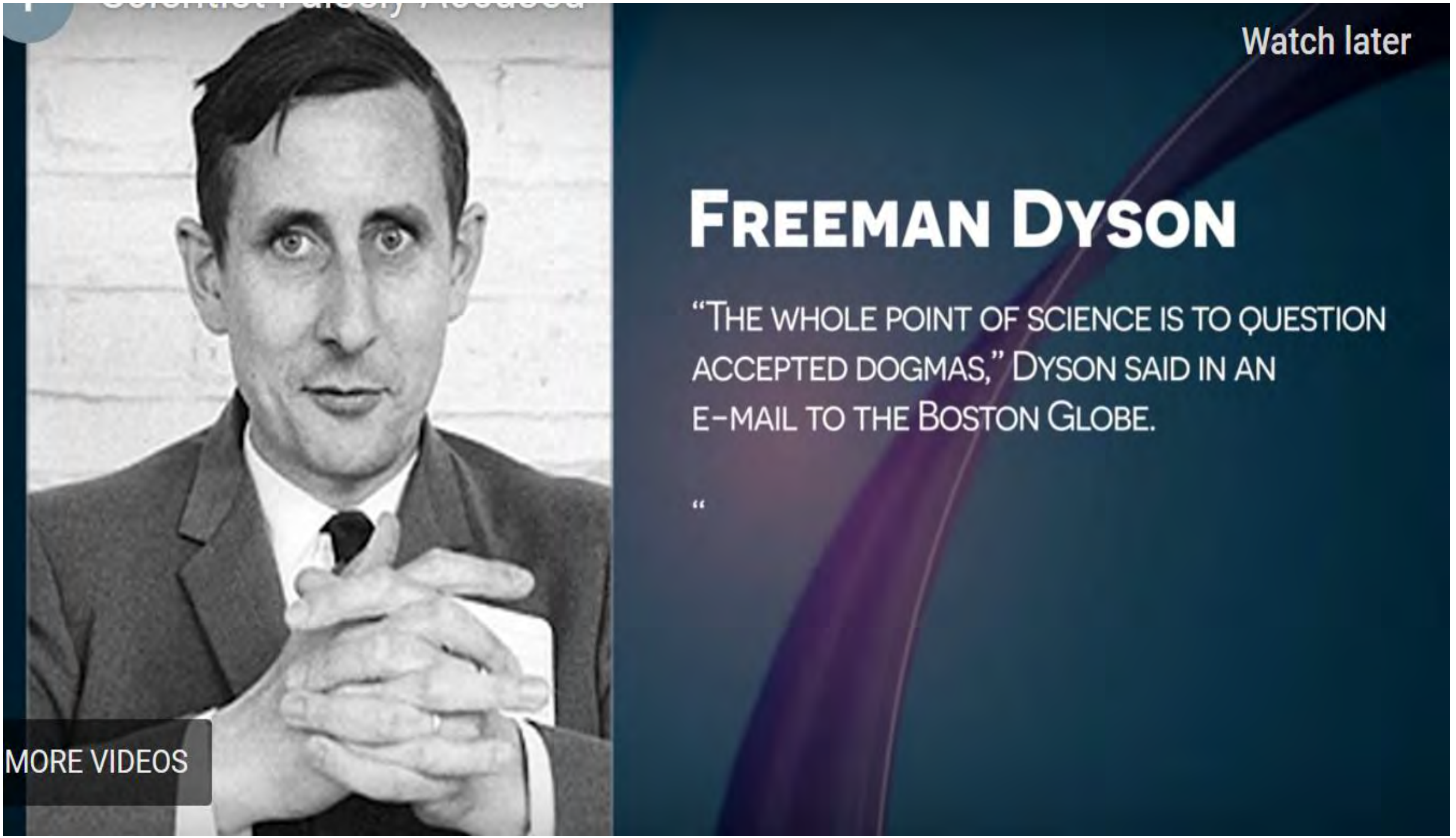
- **Roy Spencer** (born December 20, 1955) is a meteorologist, a principal research scientist at the University of Alabama in Huntsville, and the U.S. Science Team leader for the Advanced Microwave Scanning Radiometer (AMSR-E) on NASA's Aqua satellite. He has served as senior scientist for climate studies at NASA's Marshall Space Flight Center.
- **John Christy** is a Professor of Atmospheric Science and Director of the Earth System Science Center at the University of Alabama in Huntsville (UAH). He has also been Alabama's State Climatologist since November 2000.
- **Patrick Moore**, co-founder of Greenpeace. PhD in Ecology
- **Don Easterbrook** Geology Professor Emeritus, WWU
- **Ray Pielke, Jr.** has been on the faculty of the University of Colorado since 2001
- **Richard Lindzen**, emeritus professor of meteorology at MIT, Alfred P. Sloan Professor, beginning in 1983. Prior to that he was the Robert P. Burden Professor of Dynamic Meteorology at Harvard University.
- **Judith Curry** is an American climatologist and former chair of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. Her research interests include hurricanes, remote sensing, atmospheric modeling, polar climates, air-sea interactions
- **Bob Carter** (9 March 1942 – 19 January 2016) was an English palaeontologist, stratigrapher and marine geologist. He was professor and head of the School of Earth Sciences at James Cook University in Australia from 1981 to 1998

Warmists who have become Skeptics

- Claude Allegre, prominent French scientist and socialist
- Ivar Giaever, former science advisor to Obama
- James Lovelock, developer of the Gaia Principle
- William Briggs, Statistician
- Caleb Rossiter, Policy expert, Climate statistician
- David Bodkin, former Chair Envio. Studies, UCalif.
- Richard Tol, IPCC – had his name removed from IPCC report
- Philip Stott, Univ. London
- Denis Rancourt, Univ. Ottawa
- John Theon, Sr. Atmospheric Scientist, NASA
- Michael Schellenberger, Prominent Environmental Activist

Peer-reviewed Skeptical Papers Bibliography

- http://www.populartechnology.net/2009/10/peer-reviewed-papers-supporting.html
- **This is a bibliographic resource for skeptics not a list of skeptics.** Lists of skeptical scientists can be found here:
- 31,487 Scientists Reject AGW Alarmism
- https://shepherdgazette.com/49-nasa-scientists-inform-the-fact/
- 1100 Climate Realists sign 'The Manhattan Declaration on Climate Change'
- 1000+ International Scientists Dissent Over Man-Made Global Warming Claims
- 300+ Eminent Scientists Reject U.N. Climate Change Treaty
- https://www.iceagenow.com/More_than_100_scientists_rebuke%20Obama.htm


Watch later
FREEMAN DYSON
"THE WHOLE POINT OF SCIENCE IS TO QUESTION ACCEPTED DOGMAS," DYSON SAID IN AN E-MAIL TO THE BOSTON GLOBE.
"
MORE VIDEOS

Watch later Shar

Willie Soon

University of Southern California: B.Sc. (1985), M.Sc. (1987), Ph.D. in Aerospace Engineering with distinction (1991).

Within the framework of a proper study of the sun-climate connection, you don't need CO_2 to explain anything.

- His doctoral thesis was titled *Non-equilibrium kinetics in high-temperature gases.*
- er at the Solar and Stellar Physics (SSP) Division of the Harvard-Smithsonian Center for Astrophysics.
- Received the IEEE Nuclear and Plasma Sciences Society Graduate Scholastic Award in 1989.
- Received the Rockwell Dennis Hunt Scholastic Award from the University of Southern California in 1991.

MORE VIDEOS

Scientist Falsely Accused

Watch later Shar

Judith Curry

B.Sc. (geography), Northern Illinois University, (1974)
Ph.D. (geophysical sciences), University of Chicago (1982)

I am broadly concerned about the slow death of free speech, but particularly in universities and also with regards to the climate change debate.

- Co-author of *Thermodynamics of Atmospheres and Oceans* (1999). Co-editor of *Encyclopedia of Atmospheric Sciences* (2002)
- Published over 130 scientific peer reviewed papers
- Among her awards is the *Henry G. Houghton Research Award* from the American Meteorological Society in 1992
- Former chair of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology
- She is a member of the National Research Council's Climate Research Committee

MORE VIDEOS

- “I would like to add something that’s not essential to the science, but something I kind of believe, which is that you should not fool the layman when you’re talking as a scientist. I’m talking about a specific, extra type of integrity that is not lying, but bending over backwards to show how you’re maybe wrong, that you ought to do when acting as a scientist. And this is our responsibility as scientists, certainly to other scientists, and I think to laymen.”

- **Richard Feynman, Cargo Cult Science**

Top Recommendations:

- Restoring Scientific Debate on Climate
- https://wattsupwiththat.com/2020/10/03/restoring-scientific-debate-on-climate/
- Excellent extensive set of links to all climate issues, pro and con
- https://sealevel.info/learnmore.html
- Video on opening page of 1st link is a complete review of this topic. The link is "Climate Curious" and the video is "Siegal Climate Movie 2"
  - https://www.youtube.com/watch?v=06ac0CuFevw
  - Many other good videos here
- http://www.climatedepot.com/wp-content/uploads/2019/12/Climate-Talking-Points-Report-December-2019-Delivered-to-UN-Climate-Summit-in-Madrid_FINAL.pdf

When a politician says, concerning an issue involving science, that the debate is over, you can be sure of two things: The debate is raging, and he is losing.

- This first link is a short discussion about the climate debate (you might read this short piece first):
- https://rclutz.wordpress.com/the-dysfunctional-climate-debate/
- The next is probably the most popular skeptic site and is usually updated daily.
- https://wattsupwiththat.com/
- This site concentrates on scientific published papers and has a large and detailed subject index
- http://www.co2science.org/
- GWPF is a UK organization that provides emails (if you sign up) with current worldwide articles
- https://www.thegwpf.org/ **Newsletter at Benny Peiser peiser@thegwpf.com**
- https://www.youtube.com/watch?v=d0Z5FdwWw_c and
- https://www.bing.com/videos/search?q=patrick+moore+videos+CO2&docid=607995248402172558&mid=90260FF6BD50034C725A90260FF6BD50034C725A&view=detail&FORM=VIRE Patrick Moore's talks on CO_2
- https://realclimatescience.com/ https://judithcurry.com/ http://www.drroyspencer.com/
- A site that explains CO2 and the benefits of (and necessity for) CO2
- http://co2coalition.org/
- Committee For A Constructive Tomorrow (CFACT) https://www.cfact.org/

NOT A SINGLE ENVIRONMENTAL PREDICTION OF THE LAST 50 YEARS HAS COME TRUE

GWPF

EARTH DAY 1970

THE GLOBAL TEMPERATURE WILL BE 4° COLDER BY 1990 AND 11° COLDER BY 2000

CIVILISATION WILL END WITHIN 15 or 30 YEARS

POPULATION WILL OUTSTRIP ANY SMALL INCREASES IN FOOD SUPPLIES

IN A DECADE URBAN DWELLERS WILL HAVE TO WEAR GAS MASKS TO SURVIVE AIR POLLUTION WHICH WILL BLOCK OUT HALF THE SUNLIGHT

CHILDBEARING WILL BE A CRIME

100-200 MILLION PEOPLE WILL BE STARVING TO DEATH DURING THE NEXT 10 YEARS

LIFE EXPECTANCY WILL BE 42 YEARS BY 1980

BY THE YEAR 2000 THERE WON'T BE ANY MORE CRUDE OIL

FISH WILL SUFFOCATE

EARTH DAY 2020

- CIVILISATION STILL EXISTS
- LIFE EXPECTANCY HAS INCREASED BY 30% TO 72
- EXTREME POVERTY HAS HALVED
- INFANT MORTALITY HAS DECREASED BY 72%
- AIR POLLUTION HAS SHARPLY DECLINED
- FOOD HAS INCREASED FROM 2,300 CAL. PER PERSON A DAY TO 2,800 DESPITE POPULATION INCREASE
- CHINA ENDED IT'S ONE CHILD POLICY LAST YEAR
- US OIL + GAS ARE AT THEIR HIGHEST LEVELS SINCE 1972 AND THE US CONTROLS THE WORLDS LARGEST UNTAPPED RESERVES
- WORLD DEMOCRACY HAS RISEN 536%
- AVERAGE SCHOOLING HAS INCREASED FROM 3.9 TO 8.4 YEARS, A 115% INCREASE


DILBERT
BY SCOTT ADAMS
WE'LL NEED A SCAPEGOAT TO BLAME FOR OUR FAILURE ON THIS PROJECT.
Twitter: @scottadamssays
NO ONE WILL BELIEVE IT WASN'T OUR FAULT.
ARE YOU KIDDING?
PEOPLE WILL BELIEVE ANYTHING.
WE JUST HAVE TO BE THE FIRST TO FRAME THE SITUATION.
I SUPPOSE WE COULD MAKE OUR LIE SOUND CREDIBLE.
THAT'S OVER-KILL.
WE DON'T NEED TO SOUND CREDIBLE?
NOT EVEN A LITTLE.
OUR PROJECT FAILED BECAUSE OF CLIMATE CHANGE.
THAT SOUNDS RIGHT.
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Dilbert.com
7-14-19